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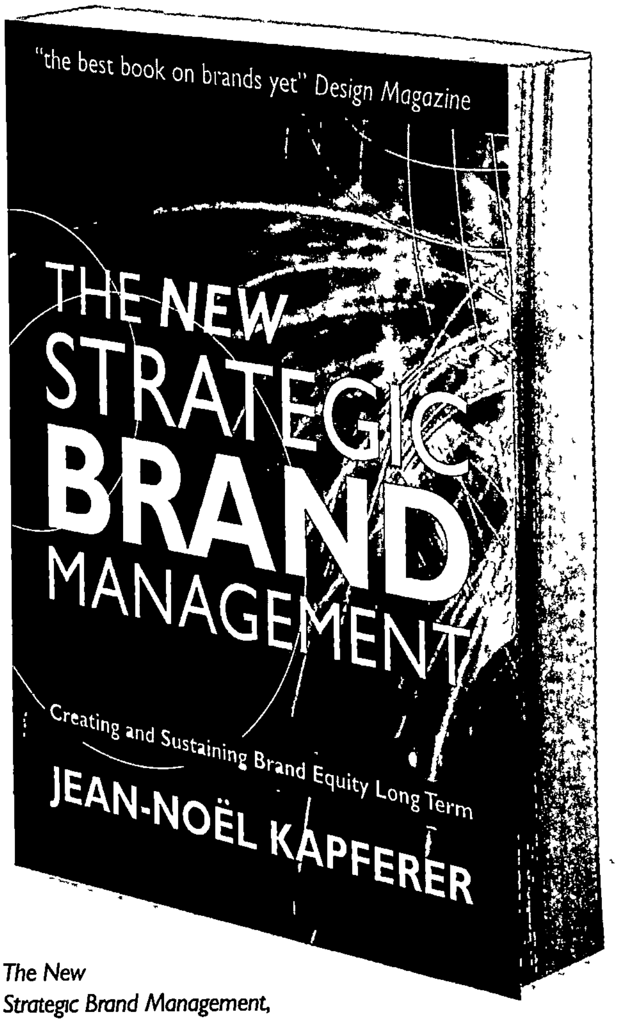
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American Marketing Association
311 S Wacker Drive, Suite 5800
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Deborah J. MacInnis & Gustavo E. de Mello

The Concept of Hope and Its Relevance to Product Evaluation and Choice

This conceptual article uses an appraisal theory perspective to define the construct of hope and describe its relevance to consumer behavior, marketing, and public policy in the domains of product evaluation and choice Using the appraisal dimensions of hope, the authors identify a set of marketing tactics that are designed to stimulate hope They posit that hope plays a moderating role in the relationship between well-known antecedent variables (e g , involvement, expectations) on the one hand and evaluative judgments (e g , attitudes, satisfaction) and consumer choices on the other hand The authors advance specific propositions that describe the effects Furthermore, they argue that the effects have implications for marketing and public policy The article concludes with a call for additional research relevant to the study of hope

Each day, millions of consumers engage in such behaviors as investing in the stock market, buying lottery tickets, attempting to lose weight, reading self-help books, undergoing cosmetic surgery, visiting therapists, and seeking a renowned physician for a given illness What do all these consumption situations have in common? Among other things—hope

Indeed, hope is a marketable entity that affects the economic viability of many industries The beauty industry alone is a multibillion dollar business that influences the viability of cosmetics companies, pharmaceuticals, plastic surgeons, department stores, salons, spas, beauty parlors, magazines, and books The latter two industries are sources of hope, promoting "secrets," "tools," "tips," and "tricks" to better looks, a more alluring body, improved romantic relationships, and enhanced self-esteem Charles Revson, the founder of Revlon, aptly captures the impact of the marketplace on hope "In the factory we make cosmetics, in the store we sell hope" It comes as no surprise that "hope" is a common word in everyday language, Shimanoff (1984) finds that, in everyday conversations, hope is among the most frequently named emotions

In their motivational theory of emotions in advertising, Rossiter and Percy (1987) propose that hope is one of four basic emotions, along with fear, relief, and disappointment Still, despite its relevance to human behavior in general and consumer behavior in particular, little has been written about the concept of hope Lazarus (1999, p 653) writes, "With a modest number of exceptions there has been a great reluctance on the part of psychologists to address the concept of hope" Averill (1991, Averill, Catlin, and Chon 1990) believes that the dearth of a systematic study of hope is attributable to traditional emotion theories' failure to recognize it as an emotion Such theories tend to focus on emotions that have a strong biological and physiological emphasis (e g , fear, anger, love) that may not encompass more intellectual emotions such as hope Only with the development of appraisal theory as a theoretical approach to emotions has hope emerged as a bona fide emotion (Frijda 2000, Lazarus 1991, Roseman 1991, Shaver et al 1987, Smith and Ellsworth 1985)

The purpose of this conceptual article is to shed light on the relevance of hope to consumer behavior, marketing, and public policy First, we use an appraisal theory perspective to define hope and to differentiate it from potentially related constructs Second, we use the appraisal dimensions of hope to identify tactics that marketers use to stimulate hope Third, we describe the relevance of hope to the discipline Although its relevance is potentially wide reaching, we focus on product evaluation (e g , attitudes, satisfaction) and consumer choices We conclude with additional research questions relevant to the study of hope

What Is (and Is Not) Hope: An Appraisal Theory Perspective

According to appraisal theory, emotions are caused by a person's interpretation of a given situation (Frijda 1986, 1991, Roseman 1991, Smith and Ellsworth 1985) Although researchers have articulated several diverse appraisal theories of emotion, all contend that emotions are responses to a person's interpretation or appraisals of the environment and its relevance to goals

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Deborah J MacInnis is Professor of Marketing (e-mail macinnis@usc edu), and Gustavo E de Mello is a doctoral student in marketing (e-mail demello@marshall usc edu), Marshall School of Business, University of Southern California The authors thank Valerie Folkes, Allen Weiss, C W Park, Allison Johnson, and Shashi Matta for their comments on previous drafts of this article The authors also thank the three anonymous *JM* reviewers for their insightful suggestions throughout the review process

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Appraisal theorists suggest that people appraise their environment along several appraisal dimensions, namely, (1) goal congruency, (2) personal agency, (3) certainty, (4) normative/moral compatibility, and (5) importance.[1] According to appraisal theory, various appraisal dimensions combine to evoke a specific emotional response. Hope is a positively valenced emotion evoked in response to an uncertain but possible goal-congruent outcome. Of particular relevance to hope are the dimensions of goal congruency, certainty, and importance.

The goal-congruency dimension reflects the extent to which the environment is or is not conducive to goal fulfillment. In a benign environment, "goal congruent" means that a favorable outcome could occur. In an aversive or threatening environment, "goal congruent" means that a negative outcome could be avoided or solved. Environments appraised as goal congruent (incongruent) are evaluated as good or desirable (bad) and evoke positive (negative) emotions.

Research has empirically confirmed that hope is a positive emotion (Shaver et al. 1987) that arises from environments or outcomes characterized as goal congruent (e.g., Ellsworth and Smith 1988; Lazarus 1991) and uncertain but possible (e.g., Roseman 1991; Roseman, Spindel, and Jose 1990). Outcomes regarded as certain will not evoke hope. Averill, Catlin, and Chon (1990) find that college students reported terminating hope when the time during which the goal-congruent outcome should have occurred had passed (i.e., students were certain that the outcome would not happen) and/or when they were certain that the goal could not be achieved. A person feels hopeless when he or she is certain that a goal-congruent outcome will not occur (Seligman 1975).

In this article, we sometimes use the term "possible" as a shortcut to the expression "uncertain but possible" or simply "uncertain" for three reasons: (1) The term "possibility" is endemic in the definition of hope offered by several hope researchers (Gelwick 1979; Haase et al. 1992), (2) it is logically correct (i.e., a person does not hope for something that is uncertain per se but for something that is possible even though it is uncertain), and (3) from a clarity of exposition perspective, it is simpler (i.e., stating that a person regards an outcome as "impossible" is simpler than stating that a person is "certain that an outcome will not occur"). The term "possibility" is embedded in "uncertainty" and thus is strongly consistent with appraisal theory.

Although the existence of hope is predicated on appraisals of outcomes viewed as goal congruent and possible, appraisal theorists link its intensity to variation in the importance and goal-congruity dimensions. The more important a person perceives a goal-congruent outcome, the greater is the value attached to its occurrence and the more severe are the potential consequences of its failure. Averill, Catlin, and Chon (1990) find that objects of hope are described as highly important. Hope is not viewed as an appropriate emotion when the outcome is trivial. Lazarus (1991) indicates that in some cases, the value or importance is driven by perceived deficiencies between the current and the desired end state. Lazarus (1999, p. 653) writes, "A fundamental condition of ... hope is that our current life circumstance is unsatisfactory—that is, it involves deprivation." Consistent with this idea, Hamilton (1978) indicates that perceived deficiencies in economic assets stimulated hope for gold in the California Gold Rush. Similarly, participation in the lottery is greatest among consumers with the most limited economic means (Clotfelter and Cook 1989).

The intensity of hope also varies as a function of variation in goal congruity or of the degree to which the outcome is positive or desired. Averill, Catlin, and Chon (1990) find that people no longer feel hope when they no longer desire the outcome.

Following Lazarus (1991), we use the term "yearning" and conceptualize it as the joint combination of the degree of importance and goal congruity. Yearning, and thus the intensity of hope, can be conceptualized in terms of the degree to which the outcome is positive or goal congruent, weighted by the outcome's importance. Hope is not equated with yearning; yearning for a goal-congruent outcome that is regarded as certain evokes emotions other than hope. Yearning for a goal-congruent outcome that is appraised as certain evokes emotions such as joy (when oriented toward the present) and nostalgia (when oriented toward the past). Likewise, yearning for a goal-congruent outcome that is appraised as certain not to occur evokes despair, not hope.

Distinguishing Hope from Other Constructs

Expectations. The distinguishing of hope from expectations is critical because several consumer behavior phenomena are predicated on the concept of expectation (e.g., expectancy value as in subjective expected utility and multiattribute attitude models, expectancy disconfirmation in the satisfaction literature). First, hope is an emotion, whereas expectations are beliefs. Second, hope reflects situations described as goal congruent, whereas expectations and perceived probabilities encompass situations that are goal congruent, goal incongruent, or goal irrelevant. Third, feelings of hope are based on appraisals of possibility, not of probability. A person can experience hope even when the probability of an outcome is low. For example, many examples from medicine indicate that consumers experience hope about overcoming disease even in the face of overwhelming odds (Lazarus 1999) and that people given the exact same probabilities of survival vary greatly in the degree of hope that they feel. The difference is that some people interpret even extremely low probability estimates of survival as evidence of the possibility of recovery (Taylor and Brown 1988; Taylor et al. 2000).

Involvement. Park and Mittal (1985) define involvement as goal-directed arousal. Hope and involvement may be empirically related; for example, a consumer who has strong hope for a goal-congruent outcome (e.g., profiting from the stock market) may be highly involved in activities that support its occurrence (e g , by consulting prospectus sheets, friends, and brokers)

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[1] Although many different terms have been used to describe the appraisal dimensions, most fit the set of dimensions articulated by Johnson and Stewart (2004) and described herein.

However, the two concepts are conceptually distinct First, whereas involvement reflects arousal or energy, hope is more It is a positive emotion, and an emotion attached not to an advertisement, a message, a brand, a medium, or a decision but to a goal Second, hope is linked to outcomes from a decision, not the decision itself Third, importance is an antecedent to involvement, though it is a critical component of the yearning dimension of hope Finally, hope can vary even when involvement is high For example, two consumers may both be highly involved in finding a one-bedroom apartment in a large city, because the task is high both in personal relevance and in potential risk (e g , economic, psychological, social, time) However, one of the consumers may have considerably stronger hope of finding an apartment because the goal-congruent outcome is both yearned for and uncertain Specifically, one of the consumers may have greater yearning to find a one-bedroom apartment because he or she finds it important to self-esteem to create an independent life (perhaps because of feelings of deficiency in the self-concept as an independent person) and/or finds the prospect of getting away from family problems at home highly goal congruent and desirable

Marketing Tactics That Induce and Enhance Hope

Rossiter and Percy (1991, p 103) suggest that "all ads make a 'promise' and thereby invoke hope—whether this hope be for termination of a negative state (negative reinforcement) or for onset of a positive state (positive reinforcement) " In other words, because hope is evoked when a goal-congruent outcome is uncertain but possible, varying the hope that consumers feel should be influenced by marketing activities that affect appraisals of possibility and/or the extent to which they yearn for the goal-congruent outcome Table 1 summarizes an illustrative though nonexhaustive set of tactics that affect the appraisals and thus elicit hope The first set of principles identifies factors that induce hope by making possible a goal-congruent outcome previously appraised as impossible The second set identifies factors that enhance hope by affecting yearning

TABLE 1
Tactics That Induce and Enhance Hope

Principle	Tactic
Turn Impossibility into Possibility	
Suggest possibilities in the product	Promote innovations New product features to overcome obstacles to attainment of the hoped-for outcome (e g , "Our new, state-of-the-art, patented formula brings you results you've never been able to achieve before!")
	Promote product customization The product or service can be adapted specifically to fit the needs of the consumer (e g , "A diet plan just for you ")
Suggest possibilities in the person	Appeal to personal control (e g , "Just do it!")
	Model others' actions and outcomes (e g , "Look at me now!")
	Promote anticipatory imagery (e g , "Just see yourself free of joint pain ")
Suggest possibilities in the process	Imply knowledge revelation (e g , "The best-kept secret for keeping sex alive ")
	Reflect pathways thinking (e g , "A new workout you can do at home, at work, or in the car ")
Enhance Yearning	
Enhance perceived importance	Link to the achievement of higher-order goals (e g , "Losing weight makes you healthier, increases your self esteem, and gains you respect and admiration from others ")
	Comparisons with ideal others (e g , upward comparisons to successful others, celebrities "The same diet that changed Oprah's life ")
	Comparisons with ideal past self (e g , "Remember when you were able to run five miles without breaking a sweat?")
	Comparisons with ideal future self (e g , "Be all that you can be ")
Enhance the goal congruity of the outcome	Encourage positive fantasy (e g , "What would you do with a million bucks?")
	Suggest resolution of an approach-avoidance conflict (e g , "Eat all you want and still lose weight!")

Inducing Hope by Altering Certainty

Tversky and Fox (1995) suggest that events have the greatest impact on cognitive assessments of the environment when they turn an outcome perceived as impossible (certain not to occur) into one that is possible (and thus uncertain) As Table 1 shows, the possibilities may reside in the product, the person, or the process of goal pursuit

Suggest possibilities in the product Innovations reflect new products or attributes that imply possibilities for achieving goal-congruent outcomes that formerly were viewed as impossible Therefore, marketing communications that imply possibilities of goal-congruent outcomes with respect to novel aspects of products should induce hope Possibilities are inferred when communications claim that products involve "breakthrough technology" or offer "revolutionary" designs Because the outcomes are breakthrough and the designs revolutionary, perceptions that the new product can make goal-congruent outcomes possible seem to be natural

Consumers may experience the possibility of a goal-congruent outcome thwarted by existing products' inability to achieve the goal-congruent outcome, even given the personal or environmental contingencies that hinder goal achievement However, customization implies the possibility of a goal-congruent outcome by creating a match between a specific product configuration and a consumer-specific yearned outcome It also implies the possibility of goal achievement by eliminating or greatly reducing personal or environmental contingencies that may thwart goal achievement For example, personalized weight-loss programs "custom designed" to fit a person's metabolism may enhance a person's hope to achieve previously unattainable goals

Suggest possibilities in the person In contrast, it may be proposed that possibilities for achieving the goal-congruent outcome lie in the person (see Table 1) Curry and colleagues (1997) indicate that the difference between people who feel strong hope and people who feel weak hope is that the former perceive that they have personal control over the occurrence of goal-congruent outcomes, because control suggests that achievement of such outcome is inherent in the person Analogously, Seligman (1975) indicates that people feel hopeless when the situation affords no control over aversive outcomes (see Bandura 1997) Therefore, products, brand names, and marketing communications that suggest that they help consumers control a consumption outcome should enhance hope Titles of books in the self-help industry usually imply that a person has power and can take charge of life forces to achieve hoped-for outcomes Nike's "Just do it!" slogan also implies that control resides in the consumer

Consumers may also perceive that the possibility for achieving a goal-congruent outcome lies with them when communications model similar others who have successfully achieved the yearned-for outcome Such models evoke hope because achievements by similar others are perceived as diagnostic of possibilities that a person may achieve him- or herself (Bandura 1997) For example, the weekly announcement of new lottery winners and before-and-after pictures of similar others lead to the inevitable conclusion "If it can happen to them, why not me?"

Anticipatory self-imagery may also promote the perception that goal-congruent outcomes are possible and reside in the person Considerable research suggests that imagining future outcomes increases people's assessments that a goal-congruent outcome will occur (for a review, see Johnson and Sherman 1990) As evidence of the impact of anticipatory self-imagery on hope, Wilkinson (1990) finds that anticipatory self-imagery of positive outcomes helped cancer patients replace depression and despair with hope

Suggest possibilities in the process Achievement of goals is impossible if a person does not know how to do so Accordingly, perceptions that a goal-congruent outcome is possible should be enhanced by knowledge revelation, specifically, by revealing secrets, or previously unknown steps to achieving them Several advertisements, books, and magazines suggest that goal-congruent outcomes are now possible given the revelation of "secrets," "tips," or "tricks"

Considerable research suggests that "pathways" thinking (i e , the perceived ability to generate multiple, plausible routes to achieve a goal-congruent outcome) enhances hope by affecting perceptions of possibility (Curry et al 1997, Snyder 2000) When multiple pathways are identified, the attainment of the goal-congruent outcome is still regarded as possible, should any one pathway be blocked For example, in a personal selling context, salespeople stimulate consumers' pathways thinking by showing multiple ways to achievement associated with product use For example, such is the case when a salesperson at a gym demonstrates the many machines and classes that can facilitate fitness and points out the location of affiliated clubs near home, work, and travel destinations

Enhancing Yearning

Hope can also be induced by enhancement of the degree of yearning for the goal-congruent outcome The antecedents to yearning (i e , importance and goal congruence) can be used to effect this inducement

Enhance perceived importance Products should be regarded as more important when they achieve lower-order goals, but they also are instrumental to achieving higher-order goals (Austin and Vancouver 1996) For example, greater yearning should be created by claims that a product helped a consumer not only lose weight but also have a more romantic and physical relationship with his or her spouse, thereby enabling higher-order goals such as social approval and love

Because the importance of an outcome can be stimulated by perceived deficiencies, yearning and hope should also be enhanced by affecting perceived deficiencies through comparisons of current states with ideal states Such comparisons may enhance hope not only by making salient what could be (i e , by affecting possibility) but also by enhancing yearning with a focus on the discrepancy between the current and the ideal states

Consumers can also make social comparisons to an ideal other, an ideal past self, or an ideal future self Appeals to any of these ideal entities should enhance yearning. For example, lottery advertisements that emphasize the glamorous life achieved by the few lucky winners induce a comparison and perceived discrepancy between this ideal life state and a person's current state. Similarly, weight loss and beauty advertisements that feature ultraslim and superfit models who epitomize beauty and athletic prowess induce perceived deficiencies and create yearning for the achievement of that ideal state. Advertisements that affect self-deficiencies by inducing consumers to make comparisons between themselves now and an ideal past are likely to create similar effects.

Enhance the degree of goal congruity. Enhancement of the degree to which an outcome is regarded as goal congruent and desired should also affect hope. Research in psychology links positive fantasy imagery with desire (Oettingen 1996; Przybyla, Byrne, and Kelley 1983). Evidence of tactics that stimulate fantasy is found in lottery advertisements that encourage consumers to fantasize about what they would do with a winning jackpot. The dating industry induces fantasies of finding a "soul mate" and emphasizes how much better life is when shared with the right partner.

Another tactic designed to enhance the degree of goal congruity is to suggest that the product resolves an approach or avoidance conflict (Rossiter and Percy 1987). For example, several diet advertisements and packages claim that products enable consumers to lose weight even when they eat as they normally would. Some skin care systems claim to provide outcomes that are as good as what could be provided by a dermatologist, but without the expensive dermatology bills; most abdominal machines guarantee great abdominal muscles with little effort.

The elicitation of hope takes on additional significance when its effects on consumer behavior are considered. We argue that the relevance of hope lies in its moderating effect on well-established antecedents of product evaluation and choice and that the moderating effects not only augment consumer behavior theory but also have important implications for marketing management and public policy (Table 2). We also argue that hope has effects that differ from what might be anticipated for expectations and involvement and that it explains consumer phenomena (e.g., susceptibility to fraud) in ways that have not yet been identified.

Moderating Role of Hope on the Involvement–Brand Attitude Relationship

A long-standing body of research suggests that the impact of advertising content on brand attitudes depends on involvement. Theoretical accounts, including the elaboration likelihood model (Petty and Cacioppo 1983) and the systematic-heuristic processing model (Eagly and Chaiken 1993), propose effects such as the ones summarized in the first two columns of Table 3. Specifically, when involvement is low (because of lack of personal relevance), product evaluation is based on easily processed (peripheral or heuristic) persuasion cues, such as the valence of the pictures, the likeability of the source, or the pleasantness of background music. Attention to, search for, and elaboration of message-relevant information is limited. In contrast, when involvement is high, consumers engage in central route or systematic processing. Consumers attend to arguments, elaborate on their merit, and form enduring attitudes based on their assessment of argument strength. Several empirical studies support the moderating role of involvement on the advertising content–attitude favorability relationship (e.g., Chaiken and Trope 1999; Eagly and Chaiken 1993; Petty and Cacioppo 1986).

When hope is strong, by definition, outcomes are regarded as personally relevant. Personal relevance should stimulate involvement and result in systematic processing. Furthermore, because it is linked to outcomes appraised as uncertain, hope should trigger systematic processing so as to reduce uncertainty (Tiedens and Linton 2001). However, we argue that the yearning component of hope alters the nature of information processing. When hope is strong (because of

TABLE 2
Why Study Hope

Implications	Moderating Role of Hope on Product Evaluation	Moderating Role of Hope on Choice and Consumption Behavior
	Attitude-Formation Processes	**Effects of Advertised Risks on Choice**
For consumer behavior theorists	Systematic versus motivated processing	Factors that affect risk encoding
For managers	Enhancing attitude favorability	Reducing the negative impact of advertising risks
For public policy	Consumer susceptibility to fraud	Susceptibility to product harm
	Postconsumption Satisfaction	**Effects of Marketing Practices on Self-Regulatory Outcomes**
For consumer behavior theorists	Understanding satisfaction processes	Understanding self-regulatory efficacy
For managers	Tactics to enhance satisfaction	Tactics to enhance success of self-regulation programs
For public policy	Competitive pressures for market improvements	Efficacy of public health campaigns

intense yearning), consumers are motivated to preserve their feelings of hope. In reducing their uncertainty about the possibility of attaining their goal-congruent outcome, they prefer to conclude that such an outcome is possible, not impossible. In other words, when hope is strong, processing is tainted with directionality, and consumers seek to reduce uncertainty in the direction of the possibility (rather than the impossibility) of the outcome.[2] Thus, we suggest that when hope is strong, attitude favorability is based less on the strength of message arguments than on the extent to which the arguments suggest that the goal-congruent outcome is possible. Rather than engaging in objective and systematic processing, consumers engage in motivated reasoning, another form of high-involvement processing.

We define "motivated reasoning" as a desire to think about and evaluate information in a way that supports a particular directional conclusion. Although both motivated and objective reasoning involve "motivation," the former involves a motivation to arrive at a yearned-for conclusion, whereas the latter involves a motivation to arrive at an accurate conclusion. With hope, the conclusion that consumers yearn for is that the goal-congruent outcome is possible. The greater the yearning for this goal-congruent outcome, the more motivated consumers are to process information in a way that suggests its possibility.

The potential impact of hope on motivated reasoning is supported by research that describes the seductive power of hope in judgment processes. Chaiken, Lieberman, and Eagly (1989) suggest that motivated reasoning is likely when people are ego-involved with an issue, as might be the case when an outcome is not only goal congruent but also associated with strong yearning (i.e., desired, important, and entailing deficiency). In a related vein, Alcock (1995) notes that people are most vulnerable to believing what they want to believe when they strongly yearn for a goal-congruent outcome. The third column of Table 3 summarizes how hope-induced motivated reasoning produces outcomes that differ from the ones expected under conditions of high-involvement objective processing.

Attention to Information

Research on attention reveals an encoding bias called perceptual defense, which is evidenced when the valence of information affects the likelihood that information is encoded and the speed with which it is processed (Bruner and Postman 1947; Matlin and Stang 1978). Because the outcomes people hope for are goal congruent, we expect that consumers are more likely to encode information that suggests that the outcome is possible (rather than impossible). The intensity of hope, driven by yearning, should magnify the extent of perceptual defense. As such, we anticipate outcomes such as the ones we describe in P_1.

> P_1: Under conditions in which involvement is high and hope is weak, consumers attend to message arguments that relate to the assessment of the true merits of the product. In contrast, when involvement is high and hope is strong, consumers attend to the message arguments that suggest that a goal-congruent outcome is possible.

As P_1 suggests, such a bias should not be evident when hope is weak (and processing is thus objective).

Length of Information Search

With objective processing, consumers attend to information carefully and thus search for and process message-relevant arguments. Thus, the length of information search should be affected by the number of message-relevant arguments or by the length of the message. However, when hope is strong, the length of information search should be affected less by the number of message-relevant arguments or message length than by the extent to which claims suggest that the goal-congruent outcome is possible. Edwards and Smith (1996) argue that people should terminate information search earlier when the information supports a desired conclusion than when it does not. We surmise that this is the case when hope is strong. Because additional search runs the risk of a person identifying information that does not support the outcome's possibility, we expect that search terminates when consumers have evidence that the goal-congruent outcome is possible. The greater the yearning is for the outcome, the faster consumers may terminate search when information supports the outcome's possibility. Thus:

> P_2: When involvement is high and hope is weak, information search is affected by the number of message arguments and/or the length of the message. In contrast, when involvement is high and hope is strong, information search is affected by the extent to which the information supports the possibility of the goal-congruent outcome; the more quickly consumers identify information that supports the possibility of the goal-congruent outcome, the more quickly they terminate search.

Elaboration of Information

When involvement in a message is high and consumers engage in objective processing, they generate support and counterarguments based on the strength of message arguments. Strong (weak) arguments generate support arguments (counterarguments). However, when involvement in a message is high and hope is strong, the nature of the elaboration process may differ, because support and counterarguments are based less on the strength of the message arguments than on the extent to which they suggest that the goal-congruent outcome is possible. Because hope is dependent on the favorability of such evaluation, the uncertainty reduction that Tiedens and Linton (2001) predict should be directed not so much by an accuracy goal but by the favored hypothesis that the product is effective, that is, that the outcome is possible. Reviews by Frey, Schulz-Hardt, and Stahlberg (1996) and Kunda (1990) indicate that when reasoning is motivated, people tend to focus on cases that confirm a favored hypothesis, a bias labeled as the "confirmation bias."

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[2] In Tiedens and Linton's (2001) experiments, the uncertainty emotion under study was incidental and dissociated from the cognitive task that followed. Participants were motivated to reduce uncertainty, but they did not have a directional motivation as to the outcome of the evaluation. However, the emotion of hope is intimately linked to the evaluative task at hand and depends on the yearning associated with the outcome related to the evaluation.

TABLE 3
Moderating Role of Hope on Brand Attitudes and Attitude-Formation Processes

	Low Involvement	High Involvement, Weak Hope	High Involvement, Strong Hope
Type of processing	Heuristic/Peripheral Route Processing Evaluation of information is based on easily processed persuasion cues	Systematic/Central Route Processing Evaluation of credibility of information based on its true merits	Motivated Processing Evaluation of information based on its suggestion that achieving a yearned-for, goal-congruent outcome is possible
Attention to information	Limited Attention to easily processed persuasion cues	Extensive Pay attention to all information relevant to assessing true merits of the argument	Selective (perceptual defense) Attend only to information that suggests that a goal-congruent outcome is possible
Length of information search	Limited	Extensive Search terminates when sufficient evidence to pass judgment has been gathered	Depends on the nature of the information encountered If information confirms that goal-congruent outcome is possible, search terminates, if it suggests it is not, search continues
Elaboration of information	Limited	Extensive Elaborate on information to evaluate the true merits of the argument	Because of yearning and uncertainty components of hope, elaboration is extensive if information suggests that achievement of yearned-for, goal-congruent outcome is possible, limited if information suggests that achievement of yearned-for, goal-congruent outcome is not possible (biased hypothesis testing) Confirmation bias for information suggesting that achievement of yearned-for outcome is possible, disconfirmation bias for information suggesting that it is not
Criteria for judging information	Limited	High	Selective Because of yearning and uncertainty components of hope, weaker acceptance criteria for information, suggesting that yearned-for, goal-congruent outcome is possible, stronger acceptance criteria for information, suggesting that yearned-for, goal-congruent outcome is not possible
Attitude toward advertised brand	Dependent on the heuristic/emotional nature of peripheral cues	Dependent on strength of message arguments	Dependent on extent to which arguments suggest yearned-for outcome is possible

The yearning dimension associated with hope should affect the magnitude of the confirmation bias If consumers are confronted with information that supports the possibility of the congruent outcome, they generate support arguments In contrast, consumers may tend to ignore or counterargue information that suggests that the goal-congruent outcome is not possible, which is known as the disconfirmation bias (Lord, Ross, and Lepper 1979) Edwards and Smith (1996) find that "emotional conviction" affects the magnitude of the confirmation and disconfirmation bias, greater bias is exhibited when people are most committed to the desired conclusion Likewise, Ahluwalia, Burnkrant, and Unnava (2000) find that when consumers have strong commitment to a company, they are more likely to counterargue negative publicity written about the firm Therefore, we expect that the more intensely a person hopes (yearns) for a goal-congruent outcome, the more confirmation and disconfirmation biases we will observe Thus, we propose the following

> P_3 When involvement is high and hope is weak, consumers elaborate on message claims, generating support arguments to claims that are strong and counterarguments to claims that are weak When hope is strong, consumers elaborate on message claims, generating support arguments to claims that suggest that the goal-congruent out-

come is possible and counterarguments to claims that suggest it is impossible

The existence of confirmation and disconfirmation biases may be driven by variation in acceptance criteria for message arguments, previous research has linked motivated reasoning to differential acceptance criteria For example, Edwards and Smith (1996) find that when people are confronted with information that goes against a favored conclusion, they tend to judge it as weaker than information compatible with a favored conclusion Thus, we expect that consumers who hope that an outcome is possible may have more lenient acceptance criteria for information that supports the outcome's possibility and also stricter acceptance criteria for information that suggests its impossibility When processing is objective, the perceived strength of an argument should not depend on the extent to which information supports the possibility of a goal-congruent outcome For example, consider the argument "stays fresh longer" for a chewing gum designed to help consumers stop smoking When involvement in the message is high and hope is weak, consumers may evaluate this argument as relatively weak because it does not pertain to the true merits of the product as a smoking-cessation device However, when hope is strong, the consumer may interpret this argument as evidence of the product's efficacy at staving off tobacco cravings for a longer period We anticipate

P_4 When involvement is high and hope is strong, consumers' evaluations of the strength of message arguments depend on whether the product information suggests that the goal-congruent outcome is possible or impossible The possibility of the outcome does not affect assessments of argument strength when involvement is high and hope is weak

Implications for Marketers

The preceding section suggests that under conditions in which consumers have strong hope for an outcome, marketers can enhance brand attitude favorability by including cues and message factors that support the possibility that consumers can achieve the goal-congruent outcome with product use, as is suggested in the tactics we described previously (see Table 1) The efficacy of the tactics is further enhanced when an advertisement contains cues that increase yearning (and thus intensity of hope) for the outcome The preceding section also suggests that when hope is strong, brand attitudes are more favorable when advertisements focus on outcomes from product use than on the product and its attributes, because the former speaks more clearly to the goal-congruent outcome and its possible achievement through product use Finally, the preceding section suggests that when hope is strong, disclaimers and product warnings are relatively ineffective as input to attitude formation or change because they are unlikely to be processed in light of perceptual defense and search termination Even if encoded, disclaimers may have less impact because they may be counterargued or subjected to stronger acceptance criteria Although prior research has identified a set of advertising and cognitive factors that impact disclaimer/product warning effectiveness (e g , Johar and Simmons 2000), no previous research has considered the impact of emotional factors such as hope on their efficacy

Implications for Public Policy

Scams and fraud deprive U S consumers of more than $100 billion annually (Langenderfer and Shimp 2001) An important public policy implication of P_1–P_4 is that when hope is strong, consumers are more susceptible to fraudulent activities Prior research indicates that vulnerability to fraud is affected by demographic, social, and cognitive factors (e g , Lee and Soberon-Ferrer 1997), however, research has not considered how emotional factors such as hope affect vulnerability Indeed, a reason that poor, less educated, and older consumers may be more vulnerable to fraud is that they are the most deficient in money and/or products, experience greater yearning, and thus are more willing to act on scam-oriented transactions that imply the possibility of deficiency reduction Thus, scams may work by suggesting that what is yearned for but seemingly impossible is actually possible, that is, they induce hope

Another implication is that hope may make consumers vulnerable to products that have no scientific backing or make outlandish claims about outcomes (e g , as is true of many diet and sexual-enhancement products), because information processing focuses not on the true merits of the product or service but on its promise of making the goal possible A laissez-faire doctrine that places the onus of deciding whether a product is appropriate for consumption on the consumer may not be effective, because motivated reasoning may preclude objective product evaluation More stringent policies that regulate marketing communications coupled with consumer education and awareness programs may be necessary Notably, and in support of the previous public policy implications, stricter standards for diet and nutritional supplements and products that claim to treat or cure disease (Anthony 2003), contexts in which hope is likely to be strong, are under consideration by the Federal Trade Commission

Moderating Role of Hope on the Outcome Valence–Satisfaction Relationship

Beyond attitude formation processes, we anticipate that hope is also relevant to consumer satisfaction Consumers' satisfaction with products has important implications for marketers, given satisfaction's effects on repeat purchasing, negative or positive word of mouth, and complaining behavior As such, several theoretical perspectives have been leveraged to identify antecedents to satisfaction judgments (e g , Spreng, MacKenzie, and Olshavsky 1996, Szymanski and Henard 2001) For example, the expectancy disconfirmation perspective suggests that consumers compare actual performance levels with expected performance levels If the product performs worse (better) than expected, a negative (positive) disconfirmation occurs, and consumers are dissatisfied (highly satisfied) (e g , Oliver and DeSarbo 1988) Equity theory suggests that satisfaction is based on the ratio of input to output (cost to benefit) received from the product in comparison with a referent other (Fisk and Young 1985) The emotions perspective proposes that emotions such as contentment, anger, or joy experienced during consumption can leave affective tags on the product's memory trace that are accessed in satisfaction evaluations (Westbrook and Oliver 1991) Finally, attribution theory (Folkes 1988) proposes that consumers' dissatisfaction with a failed product depends on whether they blame the manufacturer, uncontrollable factors in the environment, or themselves for failed outcomes For the most part, these perspectives are noncompeting, and there is evidence for all of them

Although all prior theories contend that satisfaction evaluation is contingent on the valence of the consumption outcome, we anticipate that hope moderates the impact of outcome valence on satisfaction because hope affects many of the previously identified antecedents to satisfaction, specifically (1) whether consumers perceive a disconfirmation, (2) the extent to which they perceive the exchange as equitable, (3) the nature of the emotions they experience on achievement of the goal-congruent outcome (or lack thereof), and (4) to whom they attribute product success or failure

When the Goal-Congruent Outcome Is Realized

Consider the impact of hope on satisfaction when the goal-congruent outcome is realized and thus the outcome valence is positive We expect that consumers are more likely to be satisfied with the same product experience when hope is strong than when it is weak First, consumers are more likely to experience a positive disconfirmation when hope is strong rather than weak, because the yearning associated with strong hope should engender motivated reasoning, thus encouraging consumers to engage in tactics such as biased information search, selective attention, and biased hypothesis testing so as to conclude that the outcome is possible

Second, greater yearning associated with more intense levels of hope suggests that consumers are willing to bear whatever costs are necessary to achieve the outcome Thus, from an equity perspective, the cost–benefit ratio decreases as the benefits are strongly yearned and loom large in relation to the costs incurred

Third, the uncertainty surrounding the occurrence of the goal-congruent outcome should magnify the intensity of positive emotions such as joy, happiness, and potential relief (if the goal-congruent outcome is driven by others or by environmental factors) or pride (if it is due to personal efforts) Van Dolen and colleagues (2001) show that the intensity of positive emotions such as these positively affects product satisfaction

Finally, because achievement of the outcome is appraised as uncertain, consumers may attribute its occurrence to the product, because they themselves may not have been able to make the outcome happen in absence of the product Thus, we anticipate effects such as the ones we describe in the subsequent P_{5a}

When the Goal-Congruent Outcome Is Not Realized

Consider how hope affects consumer satisfaction when product purchase or use does not result in achievement of the goal-congruent outcome We predict that consumers experience less dissatisfaction when hope is strong than when it is weak Again, the yearning and uncertainty appraisals of hope explain this counterintuitive result The yearning component of hope affects the magnitude of the *disconfirmation* The more consumers yearn for the goal-congruent outcome, the more motivated they are to perceive that the outcome has actually occurred or that some positive benefit, even if not the one originally intended, has been realized Thus, consumers may notice that though a given product does not eliminate their wrinkles, it does seem to make their skin look more "dewey" Consumers may also use selective attention and notice that the product does seem to have made the lines around their lips finer (and not notice that it has had no impact on lines around the eyes) It is entirely possible that hope-induced motivated reasoning also causes consumers to fail to encode a product failure as such Taylor and colleagues (2000) have found evidence of such illusions of success and well-being Likewise, Gilovich (1983) finds that gamblers "rewrite" their histories of success and failure by scrutinizing and explaining away their losses, they count some losses as "near-wins" Similarly, a consumer who strongly hopes to achieve a goal through product usage may rewrite the product's failure into a quasi success This logic may explain consumers' continued use of products (e g , nutritional supplements, antiaging creams) despite their negligible effects

Even if consumers perceive a product failure, they may not see the costs borne in product acquisition and usage as significant (e g , "What did I have to lose by trying?") Thus, perceptions of equity may not be negative Furthermore, because the outcome is uncertain, consumers may have already anticipated potential failure, which in turn should minimize negative emotions such as disappointment Finally, consumers may attribute lack of outcome achievement (if perceived) to their own unrealistic expectations or to other circumstantial factors (e g , "It is very difficult to lose weight over the holidays") On the basis of the preceding, we predict the following

> P_{5a} Under conditions in which the outcome is positive, consumers for whom hope is strong are more satisfied with the product than are consumers for whom hope is weak
>
> P_{5b} Under conditions in which the outcome is negative, consumers for whom hope is strong are less dissatisfied with the product than are consumers for whom hope is weak

Although it may appear odd that actual product performance is potentially unrelated to satisfaction, Szymanski and Henard's (2001) meta-analysis reveals that actual product or service performance is not a significant predictor of satisfaction Thus, situations are possible in which a product fails to perform yet consumers do not become dissatisfied

Implications for Marketers

The foregoing suggests that marketers are often in a favorable position by enhancing consumers' hope, because high levels of hope create delight and consumer satisfaction if the product delivers the goal-congruent outcome and limited dissatisfaction if it does not Notably, the effects are not explained by the concept of consumer expectations Although marketers may always be in a positive position by enhancing hope, their enhancing expectations may cause negative effects for them because it sets consumers up for a potentially negative expectancy disconfirmation Moreover, if hope has an effect on an expectation disconfirmation process, it operates through the disconfirmation component, not the expectancy component Indeed, that consumers regard the goal-congruent outcome as possible but uncertain suggests that they may have relatively weak expectations of the occurrence of the outcome Furthermore, we argue that the impact of hope on satisfaction and dissatisfaction operates through not only disconfirmation but also additional antecedents to satisfaction, such as equity and attributions

Implications for Public Policy

The potentially limiting effect of hope on dissatisfaction has consequences for both the individual consumer and the marketplace as a whole Insensitivity to product failure or the cataloging of a previous failure as a near-success may result in continued expenditures on useless products as well as disincentives for marketers to invest in significant product improvements

In addition to the effects of hope on product evaluation, hope may also influence consumer choice We examine two choice-relevant contexts (1) the impact of advertised risks on choice and (2) consumption choices in the context of self-regulation

Moderating Role of Hope on the Advertised Risks–Choice Relationship

Perceived risk reflects the extent to which use of a product or service is perceived as having (1) uncertain, (2) personal, and (3) severe consequences (Bauer 1960, Cunningham 1979) Because several products entail risk (e g , investments, gambling, cosmetic surgery, diets), marketers are encouraged to warn consumers of the risks associated with product use in advertising Indeed, in certain industries such as pharmaceuticals, government mandates require explicit risk information in advertising (Dickinson 1999) However, marketers are ambivalent about advertising risks because of the potentially negative impact of risk advertising on choice, as is reflected by their use of creative tactics to avoid explicit advertising of risks (Adams 2002)

We argue that hope moderates the negative relationship between advertised risk and choice, specifically, when hope is strong, the negative impact of advertising risks on choice is diminished compared with conditions in which hope is weak The reason is that one or more appraisal dimensions of hope (e g , goal congruity, importance) affect one or more dimensions of perceived risk (e g , uncertainty, personal nature, severity of consequences)

First, research from several areas suggests that the yearning associated with hope should affect consumers' uncertainty about the consequences of risky choice, which shifts their assessment to the possibility that negative consequences will *not* occur Research in the medical domain shows that consumers overestimate medical risk when their emotions are negative, and they underestimate medical risk when their emotions are positive (Bowen et al 2003) In a marketing domain, Chaudhuri (2002) finds that negative (positive) emotional experiences induce greater (lower) perceptions of product risk Because hope is a positive emotion whose intensity is affected by yearning, we expect that stronger levels of hope are associated with stronger perceptions that product usage does not result in negative consequences

Uncertainty about the consequences of product use may also be affected by the yearning component of hope through its effects on motivated reasoning Perceptual defense processes may focus consumers' attention on non-risk-related message information If risk information is processed, consumers may counterargue it or use stricter acceptance criteria Combined, such processes should reduce uncertainty about the consequences by making negative consequences seem less likely

Second, the yearning and uncertainty components of hope may reduce the perceived severity of the consequences Specifically, the yearning component of hope may encourage elaborated imagery (MacInnis and Price 1987), because consumers envision the positivity of life when the goal-congruent outcome occurs If consumers imagine negative outcomes at all, they may imagine outcomes that are more benign or less severe This is because the positivity associated with hope brings to mind favorable images associated with achieving a goal-congruent outcome rather than unfavorable outcomes, which makes the latter less salient and less available

Finally, independent of risk perceptions, hope may moderate the relationship between advertised risks and choice, because the yearning component of hope alters consumers' perceptions of the risk–reward trade-off (Bell 1995) That is, when hope is strong, consumers may yearn for the goal-congruent outcome so intensely that they are willing to bear whatever risk is involved to achieve it Considerable anecdotal evidence supports this effect Peiss (1998) and Brumberg (1998) discuss several risky practices that women historically have engaged in to look more beautiful, such as taking the poison belladonna to achieve "bedroom eyes," ingesting arsenic to improve their complexion, or undergoing carcinogenic X-ray treatments to reduce acne Today, consumers who hope to look beautiful use botulism to smooth wrinkles, silicone implants to achieve a more attractive bosom, and cosmetic surgery to attain a youthful appearance Consumers who hope to overcome illness are willing to take untested medications and controversial, expensive methods of alternative healing In the interpersonal domain, teens who hope to be "cool" adopt such risky behaviors as underage smoking, drinking, drug use, shoplifting, and unprotected sex Childless couples who desperately hope for children are willing to undergo expensive and potentially dangerous physical procedures to become pregnant Hamilton (1978) indicates that people risked lives, families, fortunes, and the ability to return to their homeland for the hope of striking it rich during the Gold Rush Thus

> P_6 The impact of advertised risks on decisions not to purchase a product is considerably greater when hope is weak than when it is strong because more intense levels of hope (a) increase perceptions that positive outcomes will occur, (b) reduce perceptions that negative consequences may

occur to the self and/or (c) be severe, and (d) increase the risk–reward trade-off.

The effects in P_6 cannot be explained by involvement or expectations. High involvement coupled with weak hope would induce systematic processing, thus increasing the attention to and processing of advertised risks because they constitute strong arguments as to why the product should not be chosen. Such processing should increase expectations that risks could occur to the self.

Implications for Marketers

P_6 leads to the conclusion that consumers are more prone to undertake risks when hope for the outcome is strong. Consistent with this idea, Averill, Catlin, and Chon (1990) report that respondents indicated that they took additional risks and "stuck their neck out" for things they hoped for. The previous anecdotal information also supports this idea. Thus, by enhancing consumers' hope or by targeting markets of consumers whose hope is strong, marketers of innovative products may be able to turn normally conservative buyers (i.e., late adopters) into innovators who are willing to adopt the product despite the risks of buying early. In other words, hope may cause a steeper slope of the product adoption curve of goods and services that position themselves as means to attaining goal-congruent outcomes.

In addition, hope may reduce consumers' price sensitivity. Although a high price entails economic risk, consumers may be willing to bear higher levels of economic risk when their hope for a goal is strong. Thus, an advertised high price may prove less of a deterrent to choice for consumers for whom hope is strong rather than weak.

Implications for Public Policy

P_6 also suggests that hope may affect consumers' vulnerability to product harm (Smith and Cooper-Martin 1997). Although the Spring 1995 Special Issue of *Journal of Public Policy & Marketing* indicates that medically underserved, poor, older, and rural consumers are more vulnerable to product harm, research has not considered that vulnerabilities may be tied to hope. That is, it is the consumers who yearn most for a goal-congruent outcome (e.g., the ones who are in-need) who are most likely to ignore, discount, or assume as unlikely risks from consumption.

To reduce vulnerability to product harm, communications may demonstrate safer means to achieving the yearned, goal-congruent outcome or may reduce hope by demonstrating the possibility of severe and negative consequences, thus shifting yearning to other outcomes that entail lesser risks. Notably, though, prior research has found that tactics that highlight the possibility of harm also result in defensive and biased processing, because such tactics induce fear, an emotional concomitant of hope (Pechmann et al. 2003). That research supports the impact of intense anticipatory emotions on biased processing, and it also suggests that public policy campaigns are least likely to induce biased processing and thus be more effective if they show consumers how to prevent aversive consequences through their own actions.

Moderating Role of Hope on the Marketing Practices–Self-Regulatory Outcomes Relationship

Many consumers are beset by problems of self-regulation as evidenced by overeating, compulsive shopping, gambling, drug use, smoking, and alcoholism. In many cases, problems exist despite consumers' rational knowledge that their consumption means forgoing a larger and more important long-term goal. Hoch and Lowenstein (1991) call these "time-inconsistent preferences," because the immediate behavior that consumers want to engage in is inconsistent with the longer-term goal they would like to achieve. Time-inconsistent preferences occur when the desire for a given behavior (e.g., eating, drinking, smoking) is greater than the consumer's willpower to forgo the behavior in light of a larger goal (e.g., weight loss, sobriety, nicotine-free living). Recent research has verified that desire and willpower are indeed related to time-inconsistent preferences, at least in the domain of economic spending (Karlsson 2003).

Although the marketplace is often a source of temptation, consumers also turn to marketplace products, services, and self-help groups to help them reduce desire and enhance willpower. Unfortunately, little is known about factors that may moderate the relationship between desire (or willpower) on the one hand and self-regulatory success on the other hand. We argue that an important moderator is hope.

Specifically, we posit that whether desire enhances the likelihood of a time-inconsistent choice depends on whether hope is strong or weak. The yearning and possibility dimensions of hope enhance willpower, thus rendering the impact of desire on time-inconsistent preferences less significant. As such, desire may affect time-inconsistent choices only when hope is weak. Several factors underlie our reasoning.

First, the uncertainty dimension of hope reminds consumers that the goal-congruent outcome is possible and thus makes the benefits of the long-term goal salient in light of the more immediate outcome. Second, yearning for the longer-term goal may render the immediate choice less desirable when weighed against the longer-term, yearned-for outcome. Finally, yearning associated with the goal-congruent outcome may cause consumers to imagine the anticipated regret they might feel from forgoing a longer-term, yearned-for goal for a short-term, time-inconsistent choice. Combined, these factors suggest the following:

> P_7: The impact of desire on time-inconsistent choice is minimized when hope is strong rather than weak. Thus, consumers will more successfully resist time-inconsistent choice when hope is strong.

Implications for Marketers

The preceding propositions have several implications for marketers of self-regulatory products and services. Specifically, marketers should be better able to enhance the success of their self-regulatory products and services to the extent that they create hope in consumers. For example, consider the success of programs such as Weight Watchers. The organization influences hope in meetings as attendees relate their success stories and achievements publicly Such stories remind other attendees that goal achievement is possible They also reinforce yearning as attendees relate the many and varied ways that goal achievement results in higher-order, yearned-for goals related to weight loss (e g , greater energy, respect and admiration from others, better romantic interactions)

Implications for Public Policy

Several nonprofit organizations engage in public health campaigns designed to encourage consumers to give up smoking, drinking, drugs, and the like Considerable scholarly research in the public health arena is devoted to understanding the efficacy of advertising practices that encourage cessation of self-destructive and problematic consumption behaviors (e g , Pechmann et al 2003) If hope is related to consumers' motivation to achieve self-regulatory outcomes, advertisers that promote cessation of maladaptive consumption practices may be more successful if they enhance consumers' hope about cessation and thus their motivation to heed social marketing messages Specifically, enhancement of hope may also increase a critical predictor of intentions to stop consumption self-efficacy Consumers may be more likely to believe that they can stop a behavior if they are made to understand that stopping is possible Hope may also enhance another critical predictor of intentions to stop beliefs about the consequences of stopping The yearning component of hope may enhance beliefs that the consequences of quitting are positive Thus, marketing messages that encourage hope about cessation of the maladaptive behavior may be more effective than ones that do not

Discussion

The objective of this conceptual article is to introduce the concept of hope and suggest its potential relevance to product evaluation and choice Using appraisal theories of emotion, we argue that hope is a positively valenced emotion whose intensity is a function of the extent to which a goal-congruent outcome is yearned for and appraised as uncertain but possible We also identify tactics that can stimulate hope, and we suggest that hope moderates well-established relationships that are relevant to marketing and public policy, including the relationships between (1) involvement and attitude-formation processes, (2) outcome valence from product use and satisfaction, (3) advertised risks and choice, and (4) marketing tactics and self-regulatory behaviors Several additional research questions relevant to evaluation and choice and other contexts warrant attention Given space constraints, we briefly identify a few

In the domain of attitudes, managerial and theoretical research based on the multiattribute attitude model has been extremely useful in understanding consumer behavior and in guiding managerial practice It is not known whether multiattribute attitude formation based on attribute yearning and possibility leads to attitudes that differ in valence, strength, or behavioral prediction from attitudes based on traditional attribute evaluation and belief strength, as well as the extent to which hope moderates the relationship between attitudes and behaviors

Notable questions pertaining to the impact of hope on choice timing can be identified Does the intensity of hope encourage impulsive buying? Are consumers more likely to delay gratification and delay choice, so as to live off the hope that the product, when purchased, results in the goal-congruent outcome? For example, consumers sometimes delay scratching off lottery tickets to savor the hope of a win Is waiting more difficult or easier as hope becomes stronger?

The normative and ethical implications of creating hope should also be examined Although the inducement and enhancement of hope may create positive social welfare outcomes (e g , self-regulation), it may also create outcomes that are negative from the standpoint of social welfare (e g , susceptibility to risk, susceptibility to fraud) as well as others we have not considered For example, does hope for products lead to excessive consumption and subsequent debt or credit abuse? Does hope for outcomes achieved through the marketplace encourage materialism? To what extent do the poor feel hopeless and in despair when they perceive consumption of yearned-for products impossible?

At present, answers to these and other provocative questions remain elusive The concept of hope is rich in its potential to provide insight into consumer behavior, marketing practice, and public and social policy Although the discussion here only alludes to hope's potential, we hope that it can guide theoretical and empirical work in the future

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Madhubalan Viswanathan, José Antonio Rosa, & James Edwin Harris

Decision Making and Coping of Functionally Illiterate Consumers and Some Implications for Marketing Management

A study of the decision making and coping of functionally illiterate consumers reveals cognitive predilections, decision heuristics and trade-offs, and coping behaviors that distinguish them from literate consumers. English-as-a-second-language and poor, literate consumers are used as comparison groups. The strong predilection for concrete reasoning and overreliance on pictographic information of functionally illiterate consumers suggest that companies should reconsider how they highlight the added benefits of new products or the differentiating aspects of existing product offerings across channels such as advertising, in-store displays, and positioning. Concrete reasoning also has strong implications for the execution and presentation of price promotions through coupons and in-store discounts, because many consumers are unable to process the information and thus avoid discounted products. Finally, the elaborate coping mechanisms identified and the loyalty that functionally illiterate consumers display toward companies that are sensitive to their literacy and numeracy deficiencies reveal a potential for loyalty programs aimed at this population that do not involve price discounts.

To be functionally literate, people must have the language and numeracy competencies required to function adequately as adults in day-to-day life (e.g., Kirsch and Guthrie 1977). Because of significant differences in what adult life demands across economies and cultures, researchers have argued for a plurality of literacies, and they emphasize that the skills needed to grasp written and verbal meaning successfully are dependent on context (Scribner and Cole 1981). For example, the language and numeracy skills required of consumers in Central American rural villages are different from those required of consumers in New York City. Moreover, it is possible that New York consumers are less functionally literate in rural shopping contexts than are Central American villagers on Fifth Avenue. However, in economies in which the typical consumer experience involves choosing among differentially priced offerings at self-service displays, the literacy and numeracy competencies required are relatively clear-cut. They include the ability to read labels for information that differentiates product offerings, to navigate complex shopping environments by using signage, to calculate or estimate unit prices as a way to ascertain value, and to keep a running total to avoid being short on funds at the checkout counter. The functional literacy demands in most modern economies are substantial, and the absence of such skills has significant implications for consumers and marketers. How do functionally illiterate consumers navigate shopping environments, choose among the products available, assess value, and cope with the outcomes?[1] Should marketing managers be concerned with these consumers? If they should be, what are the implications of having customers whose literacy and numeracy skills do not match what current marketing practices take for granted?

The question whether marketers should be concerned is addressed by some revealing statistics. In 1992, the National Adult Literacy Survey revealed that between 21 and 23% of U.S. consumers lack many of the rudimentary language and numeracy skills required to navigate the typical retail environment. Moreover, between 46 and 51% of U.S. consumers lack the skills required to master specific aspects of shopping, such as credit applications and sales

Madhubalan Viswanathan is Associate Professor of Business Administration, College of Business, University of Illinois at Urbana-Champaign (e-mail: mviswana@uiuc.edu). Jose Antonio Rosa is Assistant Professor of Marketing, Weatherhead School of Management, Case Western Reserve University (e-mail: jar23@po.cwru.edu). James Edwin Harris is Assistant Professor of Business Administration, Saint Norbert College (e-mail: james.harris@snc.edu). The authors thank Ellen Garbarino, Abbie Griffin, Curtis Haugtvedt, Cele Otnes, Bill Qualls, Mark Ritson, John Sherry, and participants at seminars at the University of Illinois, Nanyang Technological University and National University in Singapore, and Ohio State University for their helpful comments. They especially thank John Muirhead, Debbie McDermott, Deborah Schlomann, JoAnne Eizinger, Diane Joy, Martha Bailey-Gaydos, Carol Belber, Nina Heckman, Ellen McDowell, and Greg Vankoevering for their valuable support of the data collection and Reggie Gaither, Kevin Sanford, and Roland Gau for assistance with the data collection. This research was supported by grants to the first author from the National Science Foundation and from the Campus Research Board and the College of Business, University of Illinois. This material is based on work supported by National Science Foundation Grant No. 0214615.

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[1] We use the more appropriate term "low-literate" when we discuss the broad spectrum of literacy conditions. However, when we discuss functional literacy, we use the term "functionally illiterate" rather than "functionally low-literate" for improved readability.

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agreements (Kirsch et al. 1993). Estimates of functional illiteracy are equally sizable for other industrialized countries and even higher for developing countries (UNESCO 2000). Whereas poverty and low educational levels are associated with functional illiteracy, most functionally illiterate consumers have discretionary income and together represent a significant market. In the United States, most functionally illiterate consumers are employed and, on average, have 40% as much purchasing power as literate consumers (e.g., Kirsch, Jungeblut, and Campbell 1992). Taken with government studies (Bureau of Labor Statistics 2003), this suggests that functionally illiterate U.S. consumers may control as much as $380 billion in spending. Moreover, given the high incidence of functional illiteracy in emerging economies, in which standards of living and consumer spending are increasing, the global purchasing power of functionally illiterate consumers is significant and likely to increase.

Research on functional illiteracy spans basic and applied disciplines and covers a wide range of contexts and perspectives. It has been argued that literacy influences societies because literate thought is abstract compared with nonliterate thought, and its absence influences the level at which societies respond to their surroundings (Kintgen, Kroll, and Rose 1988). For example, the widespread use of mnemonic and word-syllable communication systems has been credited with new modes of logical thinking and context-independent abstraction (Goody and Watt 1968; Greenfield 1972). In contrast, the oral communication on which low-literate consumers rely is predominantly pictorial, dependent on context, and detrimental to abstraction (Havelock 1963; Luria 1976). Despite what is known about how functional illiteracy influences other domains of human experience, the understanding of its influence on consumers is limited. There has been relatively little research into marketing to functionally illiterate consumers, despite the segment's size and purchasing power (Wallendorf 2001). Therefore, the attaining of a more detailed understanding of how functionally illiterate consumers think and behave can help marketing research and practice better meet the needs and demands of all consumers.

A study of functionally illiterate consumers can take many directions, but we focus on how functionally illiterate consumers navigate shopping environments, assess value, make decisions, and cope with the outcomes of their decisions. We find that functionally illiterate consumers exhibit cognitive predilections, decision heuristics and trade-offs, and coping behaviors. We also find that functionally illiterate consumers struggle considerably with elements of the shopping environment (e.g., product labels, store signs, prices) that most consumers take for granted, and they spend considerable energy and cognitive resources assessing value and making decisions from information that literate consumers process tacitly and automatically. Moreover, functionally illiterate consumers incur distinct emotional and behavioral costs from shopping while displaying ingenuity in coping with such costs. Finally, functionally illiterate consumers respond positively and in sophisticated ways to marketers' efforts to accommodate their needs, and in many cases this leads to consumer loyalty.

We begin with a discussion of our methods. Next, we discuss our findings, highlighting various aspects of functionally illiterate consumers, and compare them with English-as-a-second language (ESL) and poor, literate consumers. We conclude with theoretical and practical implications and limitations of our research.

Research Methodology

Research into functionally illiterate consumers poses two challenges. First, illiteracy poses significant hurdles to the use of standard instruments, such as experiments and surveys (Wallendorf 2001). Even if respondents receive assistance, it is difficult to ascertain the measurement error that is likely to enter a standard instrument study of functionally illiterate consumers because of the range of abilities found in the low-literate population (Kirsch, Jungeblut, and Campbell 1992). Second, functional illiteracy can be a source of emotional stress and a topic that many respondents will not discuss openly. Because of the limitations, we adopted interviews and observation for our data collection. Our methods are best characterized as part way along the "continuum ranging from positivism to idealism" (Deshpandé 1983, p. 102) and can be furthered characterized as hermeneutic (Spiggle 1994), in that the breadth of data-gathering methods, the categories used to code the data, and the abstraction and comparison of data elements developed iteratively. Our purposive sampling (Lincoln and Guba 1985) was also iterative because we added ESL and poor, literate consumers to our sample as we learned more about functionally illiterate consumers.

However, ours is not an interpretive study in the classic hermeneutic tradition (e.g., Thompson, Pollio, and Locander 1994). We are not attempting to articulate the culturally informed meanings that functionally illiterate consumers attach to product labels, store signage, price information, or shopping experiences. Our objective is to better understand the processes by which functionally illiterate consumers assimilate information and make decisions and to distinguish them from other types of consumers. Even when we explore their coping mechanisms and their antecedents (e.g., anxiety, negative emotion), which by necessity involves meaning nuances, we tried to remain as close as possible to the labels the informants used. Our research is a "discovery-oriented approach" (Bendapudi and Leone 2002, p. 83), in which methods are adapted to the problems being explored and to the unique characteristics of the population under study. Data collection and analysis occurred in three phases, which we depict in Figure 1. We first describe the informants and then different elements of the methodology.

Informants

The informants were enrolled at adult-education centers in a Midwestern market. They ranged in age from 16 to older than 90 years and were divided into two groups (zero through fourth grade level and fifth through twelfth grade level) on the basis of standardized test scores in math and reading. We provide a list of disguised key informants and their characteristics in Table 1. Details about informant

FIGURE 1

Data Gathering and Analysis Process

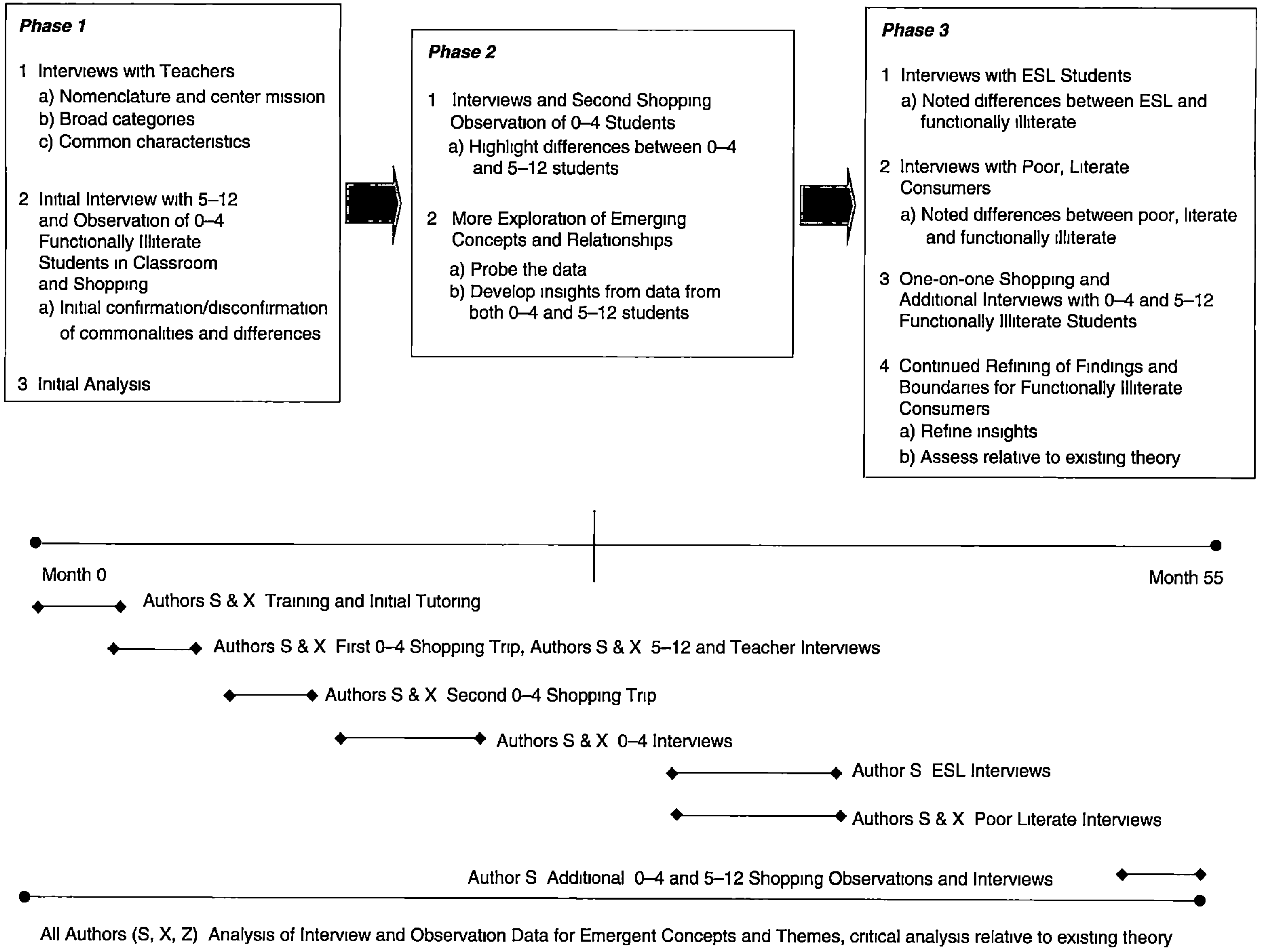

Phase 1
1 Interviews with Teachers
a) Nomenclature and center mission
b) Broad categories
c) Common characteristics
2 Initial Interview with 5–12 and Observation of 0–4 Functionally Illiterate Students in Classroom and Shopping
a) Initial confirmation/disconfirmation of commonalities and differences
3 Initial Analysis
Phase 2
1 Interviews and Second Shopping Observation of 0–4 Students
a) Highlight differences between 0–4 and 5–12 students
2 More Exploration of Emerging Concepts and Relationships
a) Probe the data
b) Develop insights from data from both 0–4 and 5–12 students
Phase 3
1 Interviews with ESL Students
a) Noted differences between ESL and functionally illiterate
2 Interviews with Poor, Literate Consumers
a) Noted differences between poor, literate and functionally illiterate
3 One-on-one Shopping and Additional Interviews with 0–4 and 5–12 Functionally Illiterate Students
4 Continued Refining of Findings and Boundaries for Functionally Illiterate Consumers
a) Refine insights
b) Assess relative to existing theory
Month 0
Month 55
Authors S & X Training and Initial Tutoring
Authors S & X First 0–4 Shopping Trip, Authors S & X 5–12 and Teacher Interviews
Authors S & X Second 0–4 Shopping Trip
Authors S & X 0–4 Interviews
Author S ESL Interviews
Authors S & X Poor Literate Interviews
Author S Additional 0–4 and 5–12 Shopping Observations and Interviews
All Authors (S, X, Z) Analysis of Interview and Observation Data for Emergent Concepts and Themes, critical analysis relative to existing theory

TABLE 1
Informant Name, Age, and Reading/Math Level Information

Name	Age	Educational and Skill Level in Reading and Math
Ben (poor, literate)	21	Not applicable, grade 12 education
Chen (ESL)	27	University graduate, grade 2–6 reading (English)
Dee	16	Grade 5–12
Esther	93	Grade 0–4
Fiona	38	Grade 0–4
Garvey	40	Grade 0–4
Ivan	29	Grade 0–4
Julie	16	Grade 5–12
Kee	38	University graduate, grade 2–6 reading (English)
Kwon (ESL)	28	University graduate, grade 2–6 reading (English)
Larry	57	Grade 0–4
Megan	58	Grade 0–4
Mei Kim (ESL)	26	University graduate, grade 2–6 reading (English)
Naomi	60	Grade 5–12
Onuki (ESL)	26	University graduate, grade 2–6 reading (English)
Otto	38	Grade 0–4
Ricardo	50	Grade 0–4
Rita	22	Grade 5–12
Sam	45	Grade 0–4
Teresa	17	Grade 5–12
Tina	24	Grade 5–12
Henry (poor, literate)	21	Not applicable, some college education
Valencio	21	Grade 5–12
Victoria	25	Grade 5–12
Xenia	46	Grade 5–12

scores are available on request We added ESL and poor, literate consumers to the study to sharpen our understanding of functionally illiterate consumers and to distinguish the influence of functional illiteracy from related factors such as language proficiency and poverty We recruited ESL students from classes offered at one of the adult-education centers Their English skills ranged from second to sixth grade level, and all had one or more university degrees We interviewed functionally literate, poor adults, whose education ranged from high school to postgraduate studies, at a homeless shelter

Methodology

We used interviews and observations At the start of the process, two of the authors attended volunteer tutor training and served as tutors at an adult-education center, one for 150 hours over 18 months and the other for 15 hours over 2 months The tutoring served a twofold purpose (1) to identify the best approach for gathering data from the respondents and (2) to establish the trust required to breach the sensitive subject of illiteracy All interviews were unstructured, but recurring themes from early phases (e g , Phases 1 and 2) were interwoven, as appropriate, into later phases (e g , Phases 2 and 3) Interviews ranged from 20 minutes to 2 5 hours (averaging 1 hour), and most interviews were tape-recorded and transcribed Observation took place during classroom activities, one-on-one tutoring sessions, and shopping trips designed as learning exercises Teaching at adult-education centers is adapted to student needs and focuses on everyday-life skills Notes and conversations were recorded during and immediately after observation sessions and were transcribed and analyzed The zero through fourth grade reading level students were observed during classroom activities and on two shopping field trips in which shopping tasks were assigned Students chose to complete shopping tasks either by themselves or in groups

One-on-one shopping observations of 15 students who had been tutored at the center were conducted during Phase 3 of the study These informants were asked to complete their typical shopping at a large chain store, and their personal funds were supplemented with $10 gift cards and two coupons Consumers were observed from a distance and occasionally approached to ask clarification questions In-depth interviews followed the observations Data collection extended over 55 months and included interviews with 14 functionally illiterate consumers at the zero through fourth grade level, 21 functionally illiterate consumers at the fifth through twelfth grade level, 9 ESL students, and 10 poor, literate consumers It also included one-on-one shopping observations, with 4 respondents of the zero through fourth grade level respondents and 11 of the fifth through twelfth grade level, and two shopping field trip observations, each of which involved 10 respondents of the zero through fourth grade level The observed respondents were among those interviewed

Table 1 provides information about respondents who are specifically mentioned or quoted in the findings section Of the 14 zero through fourth grade level respondents, 9 are listed, along with 9 of the 21 respondents of the fifth through twelfth grade level Table 1 also lists 4 of the 9 ESL respondents and 2 of the 10 poor, literate respondents The proportion of listed respondents to total respondents, by category, reflects the level of variance in how literate consumers make decisions and deal with their outcomes for each group, not the level of intensity with which we studied the groups The behavior of zero through twelfth grade level respondents differed dramatically from that of ESL and poor, literate consumers and thus receives more attention in our discussion

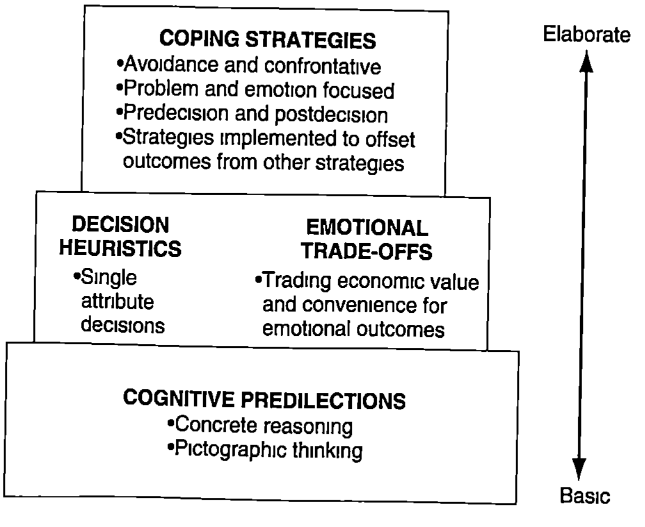
Data Analysis

All authors analyzed interview and observation data independently, focusing attention on statements and behaviors that shed light on how functionally illiterate, ESL, and poor, literate consumers process information and evaluate alternatives, make decisions, and cope with outcomes and the environment We analyzed data following established guidelines for qualitative inquiry (Glaser and Strauss 1967, McCracken 1988, Strauss and Corbin 1990), by which we identified commonalities and differences among respondents We resolved all discrepancies through discussion, and several interrelated themes developed iteratively The themes were further validated by ten university students who were not familiar with the analysis and who were each asked to read a subset of transcripts for insights into how the interviewed consumers process information and evaluate alternatives, make decisions, and cope with situations that arise during shopping As a group, the student readers identified the same themes that we identified In addition, postinferential checks were performed by teachers at the adult-education center, who agreed that our findings characterize the functionally illiterate students that they know Our findings are elaborated in the next section with quotes from the data

Findings

In general, we found that functionally illiterate consumers display cognitive predilections, decision rules and trade-offs, and coping behaviors distinct from those of literate consumers The findings are illustrated in Figure 2, arrayed as a hierarchy, with cognitive predilections as basic or foundational for decision heuristics and trade-offs and ultimately for coping strategies The hierarchical layout is intended to represent what we perceive as differences in conscious complexity, where cognitive predilections are primitive thought mechanisms or approaches that respondents adopt by necessity, but of which few are aware, decision heuristics and emotional trade-offs are implemented deliberately, but are not always based on sound reasoning, and coping strategies are carefully considered and orchestrated Although our discussion follows the classificatory scheme in Figure 2, some of the quotes serve to illustrate multiple phenomena (e g , concrete reasoning and decision heuristics) Their concurrent manifestation in the common language conversation of functionally illiterate consumers serves as evidence of the interrelatedness of the hierarchical levels we impose on the data and illustrate in Figure 2

FIGURE 2
Conceptual Hierarchy of Findings


COPING STRATEGIES
•Avoidance and confrontative
•Problem and emotion focused
•Predecision and postdecision
•Strategies implemented to offset outcomes from other strategies
DECISION HEURISTICS
•Single attribute decisions
EMOTIONAL TRADE-OFFS
•Trading economic value and convenience for emotional outcomes
COGNITIVE PREDILECTIONS
•Concrete reasoning
•Pictographic thinking
Elaborate
Basic

Cognitive Predilections

Concrete reasoning Functionally illiterate consumers display a predilection for what we call "concrete reasoning," or the basing of decisions and behaviors on the literal or concrete meaning of single pieces of information (e g , price, single ingredient content, size) and without regard to the product attributes that are represented by the isolated bits of information Concrete reasoning was manifest often when consumers struggled with trade-offs For example, when considering price and size, many functionally illiterate consumers focused exclusively on only one dimension, as illustrated next

> Interviewer Let's say you have a big bag that costs $2 50 versus a small bag that costs, say, $ 90 How do you consider sizes? Do you look for that at all?
>
> Rita Yeah, I look and see if they've the big ones or do they have any smaller size Just like in cereal I buy like the [pause] They have the big kinds of cereals, then they have, like, the smaller size Just like the Raisin Bran, I look to see which costs the most and which costs the less, and so I just get the smaller one because they cost the less

Furthermore, concrete reasoning was evident even when follow-up questions were more pointed

> Interviewer Let's say you buy a packet of bread that's half the size You are getting less bread for the money How do you try to make sure it's cheapest in terms of how much you are getting also?
>
> Naomi I just look at the tag and see what's cheapest I don't look by their sizes

The price fixation is often caused by concrete reasoning predilections that emerge even when respondents try to be careful shoppers The most common shopping approach reported by respondents before they enter adult education is to shop indiscriminately until their money is gone This approach often results in running short on food and other necessities late in the pay period To avoid such outcomes, adult-education courses reinforce the wisdom of looking for the lowest-priced products and budgeting weekly, which takes for granted that students are able to calculate or estimate unit costs and shop accordingly However, because many respondents find it difficult to calculate unit values, they focus exclusively on the price dimension

Putting aside respondents who report buying the cheapest or smallest product because of financial or storage constraints, there emerge some distinctions among consumers with respect to their concrete reasoning foci Whereas consumers such as Rita and Naomi focus on lowest price or smallest size, others compare the physical package sizes (e g , height, width) of products to derive intuitive size-to-price ratios on which they base their decision, but they do not use the standard volume or unit information printed on labels for their decision (e g , a tall 16 oz bottle may be perceived as containing more than a short 16 oz bottle) When asked, respondents who relied on physical package characteristics for their decision reported that they checked sizes and received the best deals, but their claims were not borne out when unit prices were checked

Not all concrete reasoning focused on price We also found respondents who fixated on single attributes, such as sugar or sodium content

> Teresa Anything sweet, I eat it
>
> Interviewer And how do you tell what the sugar is?
>
> Teresa I go down, and we've got, like, Some of them say 14 grams, the other might say 46 grams [of sugar] I get the one that got the most
>
> Interviewer Is there anything you look for on the package when you are buying canned food, other than price?
>
> Megan The sodium It tells you like 30% and stuff like that
>
> Interviewer What would be high?
>
> Megan About 40% would be high I can't have too much sodium

Other consumers focus on fat content and calories, usually without regard to serving sizes or how much of a particular ingredient is appropriate given the product type being considered Respondents did not report trading off between arrays of product attributes

In contrast, and without exception, ESL consumers are able to make and articulate complex multiattribute and price–size trade-offs in the same way that literate consumers are expected and advised to do

> Interviewer OK, how do you decide whether to buy large or small? Do you look at price? Do you look at size?
>
> Mei Kim If it's more cheaper, then I buy the large size For example, small size, two times the large size, but price is 1 5 times or something, I buy it large size

Poor, literate consumers also reported multiattribute and price–size trade-offs without exception

> Henry I look at price If I can get it in economy size for cheaper on a per-unit basis, I'll get the economy size

We also found similar trade-offs for product attributes such as nutritional or caloric content on a standard serving basis Unlike functionally illiterate respondents who did not seem to grasp the notion of attribute or price–size trade-offs or could not articulate how they considered these issues, ESL and poor, literate respondents displayed a clear grasp of the concepts involved As an aside, they perceive price–size and attribute trade-offs as essential and taken-for-granted aspects of shopping Some were surprised when we asked if they performed trade-offs, as if they found it difficult to envision who would not

Another manifestation of concrete reasoning by functionally illiterate consumers is their difficulty in transferring knowledge across domains of experience, in this case shopping venues Poor, literate and ESL consumers did not report anxiety or confusion when visiting new stores Both groups welcomed opportunities to shop in novel environments In contrast, nearly all functionally illiterate respondents became anxious when they shopped in new stores They had difficulty transferring the shopping skills gained from adult-education classes, such as comparing prices and considering private label products, when shopping in new stores Some even exhibited difficulty transferring basic arithmetic skills across different domains

> Interviewer OK, now, before you went to adult education, would you check prices like you're checking now?
>
> Otto No, I'd just go in and get stuff and throw it in the basket and keep going
>
> Interviewer Even though you could count very well?
>
> Otto Yeah, I'd just throw it in there and go, not even worry about it But now, you see, you gotta look, be careful, you know

Otto is someone who needed to be taught to apply arithmetic skills when shopping, despite having proved his numeracy skills in other contexts Before going to prison, he sold illegal drugs for several years, a profession in which counting errors can result in beatings or worse In that occupation, Otto handled transactions worth hundreds of dollars and made proper change on street corners However, he could not process prices and keep running counts in grocery stores In other words, his numeracy skills were context dependent Another example of context dependent numeracy comes from Esther, who entered the adult-education center in her eighties Although Esther has difficulty with simple arithmetic tasks in the abstract (e g , adding columns of numbers), she can keep a running total of what she has put in her cart and compare it with whatever she has available to spend on the basis of magnitude relationships between currency types that she learned as a youth If Esther can hold or envision dollar amounts in currency (e g , bills and coins), she can perform simple addition and subtraction and maintain a relatively accurate running total of her purchases She cannot make the same calculations in classroom exercises

Our findings are consistent with previous research that shows that low-literate people can perform concrete operations on specific units such as time and engage in concrete context-sensitive thinking based on practical necessity, but they have difficulty with trade-offs that require abstraction (Greenfield 1972, Luria 1976) Among functionally illiterate consumers, price appears to be a central unit on which concrete operations are performed The necessities of handling money, transacting on the basis of price, having relatively available price information, and identifying the lower price (i e , the lower number) relatively easily are likely fac-

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tors that influence concrete reasoning using price However, combining attribute information to generate value abstractions seems to be beyond the common practice of many functionally illiterate consumers

Pictographic thinking A related predilection revealed by functionally illiterate consumers is for pictographic thinking, or the attachment of literal and concrete meaning to pictorial elements, such as color, font, package illustrations, and even words, instead of the abstract and metaphorical meaning often intended Pictographic thinking is not simply the use of pictorial information as representative of products or attribute arrays when choosing brands or viewing advertisements This is something that literate consumers also do (Scott 1994) Pictographic thinking extends beyond a high reliance on pictures and includes the treatment of symbolic information (e g , brand names, dollar amounts) as images, or visualizing amounts to buy rather than using the more symbolic weight or volume information In the case of functionally illiterate consumers, we found inordinate and sometimes exclusive reliance on the pictographic characteristics of encountered stimuli and an accompanying face value interpretation of whatever was being attended to Use of physical package sizes (e g , height, width) to perform price-to-size value assessments is one example of the pictographic thinking we encountered

Many functionally illiterate consumers reveal an almost complete reliance on context-based pictorial representations We also found that many functionally illiterate consumers treat product category nomenclature on store signs (e g , canned soups, paper products), brand names, and even frequently encountered numbers as objects in a scene or photograph and dismiss much of the symbolic meaning behind the bits of information In turn, such mental handling of information leads to confusion when the graphical characteristics (e g , font style, color) of familiar words and brands are altered A pointed example comes from Garvey, who spent almost 30 minutes looking for ice cream during a shopping excursion at an unfamiliar store Garvey was made nervous by the store layout, which interfered with his ability to apply the rudimentary reading skills he had acquired in class He wanted to rely on pictographic thinking, but because the graphic characteristics of the store signage (e g , color, font, background) were different, he was not able to navigate the store by relying on pictographic thinking either His fallback strategy was to walk up and down the aisles until he spotted the logo for his favorite brand of ice cream, relying on pictographic thinking at the package level

The most common use of pictographic thinking was memorizing brands as combinations of letters in specific fonts and colors without processing the brand name as a word Otto, who could count but not read, made most of his purchase decisions that way He seemed to have a pictographic image of brands, irrespective of his liking for them after previous purchases He relies almost exclusively on those images when making decisions It is not surprising that he made mistakes when almost identical packaging was used for different products (e g , Domino's brown sugar and white sugar) Along with several other respondents, Otto also reported using pictographic thinking as a surrogate for shopping lists He visualizes cooking situations (e g , making stew) to determine how much of each ingredient to buy, and he shops by picturing himself going through the act of cooking different dishes, picking up products as his cooking mental episodes unfold

Another manifestation of pictographic thinking is the way many functionally illiterate consumers relate to currency Functionally illiterate consumers such as Esther recognize coins and paper currency because of the faces on them Many consumers have memorized the relative order of value between currency denominations (i e , $5 is less than $10) in the same less-than or greater-than way that they recognize which product has the lowest price in a particular category As does Esther, many students display rudimentary arithmetic skills when exercises are framed in the context of money, but they have difficulty applying the same skills in the abstract Luria (1976) reports a similar reliance on pictographic thinking and the manipulation of images in the estimation of travel times between cities among low-literate peasants

Some respondents recognized pictographic thinking as a strategy they use Ricardo exemplifies consumers who recognize their predilection for pictographic thinking

> Ricardo Sometimes I still have trouble with words I am more sight reading If I see something or a word that I don't know, and you show it to me and tell me what that word is, a lot of times, the next day or the day after, I am still going to know what that word is I call it sight reading
>
> Interviewer When you're buying groceries have you ever been confused in the store because of reading?
>
> Ricardo No
>
> Interviewer How do you do it?
>
> Ricardo If I want a can of Spam, I know it when I see it
>
> Interviewer If I gave you a bunch of cans on the wall how would you see it?
>
> Ricardo It has the name of it on it
>
> Interviewer New words?
>
> Ricardo Then I might have to ask somebody and I am not [pause] The majority of food products, I know I know Kellogg's cereal and a lot of that food is still on the shelf and I haul a lot of it It's not a problem with me, you see

Ricardo recognizes that he is not reading, but in effect he recognizes brand logos in the same way he might recognize people he knows in a photograph This method is what he calls "sight reading" Ricardo's approach to buying Spam is the same as Garvey's searching for ice cream in a new store Ricardo is also notable in that he is an interstate truck driver who relies on pictorial representations of street names or parts of names to navigate between cities

Poor, literate consumers did not exhibit reliance on pictographic thinking, other than the imagery shortcuts common to literate consumers (Scott 1994) The ESL consumers exhibited some pictographic thinking, such as dependence on brand logos and pictorial menus, but it did not extend to treating numbers as surface-level pictorial representations or visualizing usage situations (e g , cooking) to guide their shopping The ESL consumers reported that

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they treated some information at the pictorially based surface level, and they recognized why they were doing it

> Interviewer Why don't you ask the waitress?
>
> Onuki When we just got here, we can't really understand what he says
>
> Interviewer Then what did you do?
>
> Onuki The senior schoolmate would communicate with him in English, but we couldn't understand what they're saying So actually till this day I still don't know how to order food, since they [the seniors] are all gone We can only remember where the approximate position of the food we order was on the menu

The ESL consumers also reported that their reliance on pictographic thinking was a tactic to overcome language difficulties Many expressed that they had overcome their need for pictographic thinking the longer they lived in the United States or that they expected to overcome their need over time

The distinction between how ESL respondents and functionally illiterate respondents manage number information is also important because it has implications for the differences in the value assessments we noted previously All ESL respondents in our study had a university education and a familiarity with numbers and relations between numbers as abstract conveyors of information It is not surprising that they were able to use number information as intended and to make value assessments between products, even if they could not read all the information offered on the package However, functionally illiterate consumers treat both words and numbers as pictorial elements, and they engage in surface-level processing of both types of information Thus, they are more limited than ESL consumers in assessing value

Pictographic thinking is a predilection consistent with findings that illiteracy leads to graphic thinking anchored in the here and now (Luria 1976) Moreover, the interrelationship between concrete reasoning and pictographic thinking is noteworthy Pictographic thinking reflects a primitive ability to process information with a one-on-one correspondence to the physical world that is available to the senses rather than to the symbolic world that develops with literacy (Havelock 1963) This is the mode of processing that functionally illiterate consumers favor When functionally illiterate consumers are confronted with the practical necessity of completing transactions that involve price or choosing products by using symbolic information, they concretize the decision task by focusing on single attributes, such as price In general, functionally illiterate consumers function primarily in the visual and concrete realm rather than in the symbolic and abstract realm

Decision Making by Functionally Illiterate Consumers

Decision heuristics Some of the data discussed in the preceding section also reveal examples of single-attribute, habitual, and random product choices among functionally illiterate consumers For example, Teresa focuses on sugar and consistently chooses products high in sugar, whereas Megan focuses on sodium We also find decisions based on small size as a surrogate for low price Naomi applies the same "buy the small one" rule to everything she buys, from potato chips to laundry detergent This is in contrast to literate consumers, who consider multiple attributes (e g , price, size, content, performance characteristics) and perform mental trade-offs among such attributes Moreover, we found that Otto used to apply a random choice model in his shopping but more recently switched to a habitual choice model that processes brand names as pictorial elements

The data also provide clear distinctions between the context-based single attribute decisions of functionally illiterate consumers and consumers who, on the surface, appear to focus on single attributes but actually base their decisions on abstraction and inference processing that we did not find among functionally illiterate consumers

> Interviewer Imagine you have [a product package] in your hand What kind of information do you look at? What's the first thing you pay attention to?
>
> Chen The first I'd pay attention to is what it's selling, whether it attracts me or not, does it look tasty on the picture
>
> Interviewer So pictures are important?
>
> Chen Yeah If the picture attracts me, I'd look at its price secondly For price, I'd see if I can afford it, is it too expensive If the price is OK, then calories If a small thing has high calories, then I won't buy it
>
> Interviewer How about ice cream?
>
> Chen If it's ice cream, then I don't look at the calories
>
> Interviewer So it's selective
>
> Chen If I look at the calories, then I can't eat it It'll be too painful [smiles] For ordinary stuff, I'd look at the calories

Chen uses an elimination-by-aspects rule (Russo and Dosher 1983) when purchasing products, holding different decision criteria for different product categories and moving between focal attributes and decision standards with relative ease Ice cream is held to a price constraint but not a calories constraint, and it appears that few products are allowed such an exception Chen relies on stored category knowledge, possibly derived from some form of compensatory processing during previous shopping trips, to make inferences and abstractions (in much the same way literate consumers apply noncompensatory rules) However, in the case of functionally illiterate consumers, the rules are basic, applied without adjustment across most if not all product categories, and do not seem to involve abstraction or inferences Although functionally illiterate consumers apply noncompensatory, single-attribute decision rules, they apply the rules at a more concrete level than that used by literate consumers We believe that the applications of single attribute decision rules by functionally illiterate consumers are better classified as a coping mechanism implemented as a result of social context (Luce, Bettman, and Payne 2001) than as the use of noncompensatory decision rules (Russo and Dosher 1983)

Megan's shopping behavior further illustrates the idea that functionally illiterate consumers apply single-attribute decision rules as coping mechanisms In addition to the "avoid sodium" rule, Megan applies a "buy the cheapest" rule to most purchases, where "cheapest" is assessed in terms of package price We observed Megan ponder for several minutes the choice between a small $3 38 box of Honey Nut Cheerios and a "two boxes for $6 00" deal on the larger size of the same cereal She visually moved back and forth between the choices several times and, at one point, handled the larger box for several seconds to assess its weight Abruptly, however, she placed the small box in her shopping cart, and when we asked why she chose the smaller box, she answered that "it was cheaper" On the basis of her indecision and apparent stress over the decision, we concluded that she recognized that applying a compensatory rule would be desirable, but her difficulty in performing the calculation pushed her to decide on surface characteristics Megan is anchored in the concrete world of the senses (Luria 1976), and she applies single-attribute decision rules at the same concrete level of thinking, a level that is different from what we found that ESL and poor, literate consumers used

Emotions and decision trade-offs Megan's struggle over the Cheerios purchase highlights another distinguishing characteristic of functionally illiterate consumers the experience of adverse emotions associated with purchase decisions Stress and anxiety over purchase decisions does not affect only functionally illiterate consumers In some circumstances, such as choosing a family health plan, for which trade-offs between coverage and affordability are required, decisions can provoke anxiety for any consumer because of the potential losses that the different alternatives entail (Luce, Bettman, and Payne 2001) However, among functionally illiterate consumers, we found recurring and acute anxiety even in circumstances that, on the surface, did not seem to merit such emotional reactions (e g , shopping at a new store) Because of their difficulty in performing calculations or in reading store signs and labels, and because of the reactions of store personnel and other consumers to such difficulties, functionally illiterate consumers experience negative emotions and often find their self-esteem undermined They make significant trade-offs to avoid negative emotions and to protect their self-esteem in marketplace encounters

> Interviewer If something is 30% off and the price is $19 98, would you go up to a person and ask how much it really is?
>
> Dee No
>
> Interviewer Why not?
>
> Dee I'd be embarrassed

Dee is not alone in refusing to ask for assistance in stores or in avoiding products with fraction-off and percentage-off labels to avoid dealing with price uncertainties Julie, another respondent, only considers products that are 50% off because she can estimate the cost as half of what is posted She avoids all other fraction-off or percentage-off discounts In addition, we find that many respondents will not shop alone and expend considerable effort coordinating with other parties and planning shopping events in advance to avoid negative emotions and stress In effect, they avoid the possible negative emotions and stress of shopping by delegating their shopping to family members and other trusted persons

> Naomi No, I don't do too much stuff, my daughter do all the shopping
>
> Interviewer You used to do a lot of shopping?
>
> Naomi No, not really You know, when I am a daughter, my mom did a lot of shopping

Delegating shopping to others involves trading away convenience and time for the sake of avoiding emotional costs, because it places functionally illiterate consumers at the mercy of other people's schedules An extreme case of such delegation that we found is a consumer who shops only when her brother comes to visit every few weeks In many of the cases we found, the delegation of shopping responsibilities is a coping strategy driven by the avoidance of emotional costs Moreover, it is not difficult to imagine that some of the consumers probably suffer privations when their supply of important products is exhausted before their next planned shopping excursion, which adds welfare to the time and convenience that they trade away

Another strategy to shopping delegation is to schedule shopping trips around the availability of store personnel who help the consumers Garvey plans his shopping trips around the work schedule of a cashier who is aware of his literacy and numeracy deficiencies and who is willing to work with Garvey when items in the shopping basket exceed the funds he has on hand

> Interviewer Are you ever afraid that you don't have enough money?
>
> Garvey Yeah I try to add up in my head It is just right sometimes, and sometimes it goes over
>
> Interviewer How does that make you feel?
>
> Garvey Not too good
>
> Interviewer If you go over, what happens?
>
> Garvey Nothin' really You just say, "I can't buy that and have to take it off" I know the woman at County Market

Garvey's case is a good example of relationships between store personnel and customers contributing to store loyalty (e g , Macintosh and Lockshin 1997), which in this case involves a sensitive issue An additional observation about Garvey is the unmistakable sense of comfort that he drew from knowing that nothing would happen if he went over at the checkout counter Not all functionally illiterate consumers were that fortunate We interviewed several who attached great significance to seemingly trivial occurrences, even celebrating when they had enough money at the checkout counter or despairing when they were short of money

In general, we find that functionally illiterate consumers invest substantial effort in non-product-related aspects of shopping to reduce negative emotions Moreover, we find that many undertake time, value, and welfare trade-offs to reduce stress and emotional costs Similar trade-offs were made by some ESL informants, but not by any of the poor, literate consumers we interviewed For example, Onuki appears to give up dining variety by always choosing from the same section of the menu so as not to interact with the waiter or waitress We also encountered several ESL consumers who had recently arrived in the United States and relied on friends to help them navigate shopping environments At least for a short time, such consumers gave up time and convenience Other ESL consumers shopped primarily at a single store because it was within walking distance of their home and they did not have autos The same applied to poor, literate consumers who were limited in their choice of shopping venues because of transportation problems In general, however, ESL and poor, literate consumers exhibited little stress over shopping and were comfortable shopping in different stores as circumstances dictated or as opportunities emerged If friends invited them to other stores, ESL and poor, literate consumers went enthusiastically They did not report feeling anxious about changes in shopping venue despite the challenges that different signage and product locations represent, and they shopped as needed without undue reliance on friends and family The ESL and poor, literate consumers we interviewed exhibited independence and self-determination similar to what we expect from literate consumers and around which many marketing practices are based

Coping Strategies of Functionally Illiterate Consumers

Given the anxiety and emotional costs that many functionally illiterate consumers associate with shopping, we were not surprised to find various avoidance and confrontative coping strategies, some problem-focused and others emotion-focused and some implemented before product choice decisions and others implemented after the decision Some of the coping strategies are also used by ESL and poor, literate consumers, but we noted differences in the frequency with which the different groups use different strategies The observed coping strategies are summarized in Table 2 We classified them as avoidance and confrontative strategies (Luce, Bettman, and Payne 2001, Mick and Fournier 1998) and problem- or emotion-focused (Luce, Bettman, and Payne 2001) for illustrative purposes, based on the primary reason that respondents gave for using that strategy (typically in response to a "Why did you do that?" question) We also categorized the strategies as being implemented prepurchase decision or postpurchase decision The categorization scheme is not meant to be exhaustive or definitive In addition, some of the coping strategies can overlap categories, particularly with respect to emotional and problem-solving motivations We also find that functionally illiterate consumers often implement coping strategies simultaneously, which reinforces the previous observation that shopping behaviors can involve advanced and intricate planning Our discussion intermingles some avoidance and confrontative strategies

Some of the commonly used coping strategies are evident in examples we have already presented Same-store and same-brand strategies are examples of accepting the status quo (Luce, Bettman, and Payne 2001) The strategies are also common among ESL informants, though predominantly among those who had been in the United States for a short time As the tenure of ESL informants in the United States increases, their brand and store loyalties decrease

> Interviewer Can you describe to me what it is like when you go shopping when you just arrived here, and then after one year, two years, and now?
>
> Kwon The first year I just stick to my habit from Taiwan So most of the cases I just choose what used like the stuff in Taiwan I was willing to try something, but I should say that the habit is a little different from what I am right now I kind of understand the stuff I want to buy and kind of try out the weird things I have So I'm a little more Americanized now

Other coping strategies are to avoid fraction-off and percentage-off prices and to base decisions on single attributes, both of which are problem-focused strategies in situations in which information-processing capabilities are limited As we observed and listened to informants, we also detected an underlying need for them to perceive themselves as in control and competent as consumers, which comes across as an emotion-focused motivation

We already mentioned shopping with family members and relying on other trusted helpers A related strategy is carrying limited amounts of cash so as not to overspend Victoria implements all three She primarily relies on her mother but will turn to others if needed, and she carries a limited amount of cash ($5) when shopping alone

> Victoria Well, if I'm, like, at the store with my mom and stuff, I go around, put all the stuff in my cart, I wait until I find her, and then I go, "Mom, do I have enough money for this"? and if she tells me no, then I put back most of the stuff
>
> Interviewer What about when you are shopping on your own?
>
> Victoria When I'm shopping on my own, I mostly stay in my budget
>
> Interviewer OK
>
> Victoria If I, like, had $5 on me, I would just get one thing That would be something that is, like, $3 or cheaper than $5 Yeah, I don't, like, add very well and stuff, so it's kind of confusing to me I would need someone to help me with it Like, I would call somebody in the store or an adult—whoever is with me—and I would ask them

Another common strategy is to give cashiers all the money they are carrying, trusting cashiers to give them the correct change

> Interviewer What is the most you have spent?
>
> Larry $200 or $300 I don't count it out I give [the checkout clerk] the money I have in my pocket I can't read

We found that many informants used dissimulation as part of their coping strategies Some stand in store aisles and pretend to study product labels and compare prices so other shoppers cannot guess their literacy and numeracy deficiencies Otto used to cover up his deficiencies by claiming to have vision problems

TABLE 2
Coping Strategies

Coping Strategies	Classifications
Avoidance	
Shop at the same store avoids stress of unfamiliar environment	Problem focused shops effectively Predecision habitual choice about store helps with choices about products
Shop at smaller stores avoids cognitive demands from product variety	Emotion focused reduces stress Predecision requires advance planning
Single-attribute decisions avoids stressful and complex product comparisons	Problem focused makes decisions manageable Emotion focused preserves image of competence Predecision requires advance planning
Avoid percentage- and fraction-off discounted items avoids difficult numerical tasks	Emotion focused reduces stress Problem focused less chance of mistakes Predecision implements habitually
Buy only known brands (loyalty) avoids risks from unknown brands	Problem focused facilitates shopping Predecision implements habitually
Rationalize outcomes to shift responsibility avoids responsibility for outcomes	Emotion focused protects self esteem Postdecision implements after outcome is clear
Carry limited amounts of cash avoids risks of overspending and being cheated	Problem focused controls transactions Predecision requires advance planning
Buy small amounts more often avoids risk of large scale cheating	Problem focused controls transactions Predecision requires advance planning
Pretend disability avoids revealing deficiencies and embarrassment	Problem focused obtains assistance Emotion focused preserves public image Predecision requires advance planning
Pretend to evaluate products and prices avoids revealing deficiencies indirectly	Emotion focused preserves public image Predecision requires advance planning
Confrontative	
Shop with family members and friends enables others to know deficiencies	Problem focused helps shop on a budget Predecision involves advance planning
Establish relationships with store personnel enables others to know deficiencies	Emotion focused avoids embarrassment and stress Predecision involves advance planning
Seek help in the store enables others to know deficiencies	Problem focused facilitates final decision Predecision leads to a purchase decision
Give all money in pockets to cashier admits deficiencies, plays on honesty standards	Problem focused avoids not being able to count Predecision implements habitually
Buy one item at a time addresses the problem of loss of control when turning over cash	Problem focused controls pace of transactions and flow of funds Predecision requires advance planning
Confront store personnel and demand different treatment focuses on responses and behaviors of others	Emotion focused seeks to minimize or eliminate embarrassment and to preserve or restore public image Postdecision implements in response to others
Plan expenditures with assistance from others enables others to know deficiencies	Problem focused facilitates a budget Predecision involves advance planning

> Interviewer: So, you mentioned before that if you needed somebody's help and you would [interrupted]
>
> Otto: I would be embarrassed, I would lie, tell them that I need this, help me with this, but now I don't have to lie no more. If I can't read, I just can't read. Could you please help me if you don't mind? I'm more comfortable.
>
> Interviewer: Now, you mentioned that sometimes you would say, "Well, I can't read, can you help out?" What else would you do to get by before, when you were shopping?
>
> Otto: I tell people I got problems with my eyes. "I can't see." "I don't have my glasses with me." "Could you help me please?"

Some coping strategies are implemented to offset outcomes from other strategies. Sam does not know how to make change and is one of many informants who gives all their money to cashiers and expects the right change back. To avoid being cheated and remain within budget, Sam also implements a "one-item-at-a-time" strategy at fast-food restaurants.

> Interviewer: How much money does it normally take?
>
> Sam: $10 or $20.
>
> Interviewer: How do you know what you want to buy?
>
> Sam: I look at the menu and look to what you want and you got to figure out what it's going to come to.
>
> Interviewer: How do you do that?
>
> Sam: First you buy one thing at a time, so it come to a different price.

Sam also reports buying in small quantities and visiting stores more often to reduce the risk of being cheated.

The coping strategies discussed thus far are predecision strategies. Functionally illiterate consumers spend a lot of time planning and developing ways of getting around the challenges and negative emotions involved with shopping. They also implement postdecision coping strategies, such as retrospectively rationalizing outcomes so as to shift responsibility away from the self. For example, Victoria had a car repossessed for missing payments. She took responsibility for not staying in school and acquiring literacy skills but shifted responsibility for losing her car to unscrupulous lenders. Another example comes from Valencio.

> Valencio: I bought chicken plenty of times, and it was spoiled. Because the workers that work in the back that's making the chicken, they be taking the old chicken and selling it. They don't sell the new chicken. It's just crazy. But like I said, I bought chicken before and it was spoiled. I took it to the store, but I couldn't get my money back.
>
> Interviewer: This only happened to you one time?
>
> Valencio: It happened to me a couple of times. Not at the same store, but at different store. You know, it was spoiled.
>
> Interviewer: Why wouldn't they let you take it back?
>
> Valencio: I don't know. I don't know if they was prejudiced or what. I don't know. I came to them the correct way. I said, "I bought some chicken. Here's my receipt, and the chicken is spoiled. And you can smell it if you want to." "Well, we can't take it, sir, because it's opened." So I said, "Well, when I took it to the house I had to open it to put it in some bags, and it was spoiled." So, what am I supposed to do? For me not to argue with him I said, "No problem." I just gave him the chicken and I just went to the house. I didn't provoke anything, you know. I'm not going to make myself look bad for arguing with the man over the chicken.

Valencio was convinced that backroom clerks relabeled past-dated chicken and placed it back on store shelves. That other people do not report similar problems after shopping at the same stores does not affect his thinking. Sam used similar rationalizations to account for why he sometimes falls short of cash, attributing shortfalls to being cheated by retailers.

Another postdecision coping strategy is to remain passive and personable even when negative outcomes arise from being functionally illiterate. Garvey put on a "no-big-deal" air whenever his groceries exceeded how much he had available. Xenia responds more proactively but remains friendly and courteous throughout the situation.

> Interviewer: Have you been embarrassed going over and not having enough money? Has that happened?
>
> Xenia: Yeah. Like, I went to IGA to buy some things and the money that I pick up off the table at home was not the money I supposed to pick up so when I finish buying everything I just take out the money and hand it her and she says, "No, this is $5 you gave to me," and it [the total] was over $10, almost $20. Then I'm like, "Oh my God, I feel so bad." I tell her, I say, "OK, don't put it back. I'll just walk home and get the money and come back." I says, "OK?" She says, "Yes." So I went home and get the money.

Being friendly and courteous was common among functionally illiterate consumers, who also tend to be more passive and accepting than literate consumers.

In contrast, ESL and poor, literate consumers displayed more combative tendencies and less willingness to forgive retailers for negative experiences and the emotional or tangible costs incurred. Ben (a poor, literate consumer) exemplifies the general response of poor, literate and ESL consumers when they are stigmatized by retailers, aggressively confronting store employees who he believed were not treating him properly.

> Ben: I was at the grocery store not too long ago. We were pricing Christmas gifts, because our money was tight. We are doing some price comparison shopping. This lady from the front immediately just looks funny at us. We are walking through the store and she starts to follow us. "Is there a problem?" "Do you think we are shoplifting?" She goes, "You do look kind of suspicious." We filed a grievance with the store and I have asked my friends not to shop at the store until the grievance is taken care of.

In general, we found ESL and poor, literate consumers to be more willing to be confrontative and to demand different treatment from store personnel, and ESL consumers only hold back because of social norms. In contrast, functionally illiterate consumers were consistently more passive; most of the functionally illiterate respondents accepted the status quo of being treated differently as a metalevel coping strategy (Luce, Bettman, and Payne 2001)

Contributions, Limitations, and Further Research

Our research sheds light on functionally illiterate consumers, an understudied population with measurable and significant purchasing power We identify cognitive predilections, decision heuristics and trade-offs, and coping strategies that influence many of their behaviors The factors distinguish functionally illiterate consumers both from literate consumers and from consumers who, because of poverty or limited language skills, may be considered similar Our research provides valuable insights and has important implications for marketing research and practice

Implications for Marketing Research and Management

A fundamental theoretical issue that this research raises is whether existing models in marketing are adequate in capturing the decision making of functionally illiterate consumers The model of the "cognitive miser," who seeks to economize on cognitive resources, for example, has been prevalent in marketing and psychology However, the view that arises from our research is more of a "cognitive survivor," who, despite spending considerable resources, cannot readily engage in the abstract and analogical thinking that makes cognitive miserliness possible

Our findings emphasize that several extant theories and models of consumer behavior (e g , Luce, Bettman, and Payne 2001) should be expanded to take into account functionally illiterate consumers Despite being employed and having considerable spending power, functionally illiterate consumers process information and make decisions in ways that do not match commonly held beliefs about the influence of brand information, pricing, and product attributes on consumer judgments and choices Functionally illiterate consumers also violate assumptions about the importance of value-producing rather than non-value-producing aspects of decision contexts In many situations, they base decisions almost exclusively on non-value-producing factors, such as familiarity with the shopping environment or the personalities of sales personnel, instead of on product attributes and price It seems reasonable that the incorporation of a deeper understanding of functionally illiterate consumers into marketing theories will result in theories that have greater explanatory and predictive power and in more effective marketing practice Similar arguments can be made in the realm of public policy, in which regulation that pertains to product labeling, pricing, and branding has been implemented without apparent consideration of the needs of functionally illiterate consumers

The broad implication of our findings for marketers is that careful consideration of and research into the functionally illiterate segment with an aim toward enhancing all elements of the marketing mix can be beneficial Marketers can use the cognitive predilections, decision heuristics and trade-offs, and coping strategies that we identify to examine and design their interactions with consumers in the areas of product, price, promotion, distribution, and customer service Even more poignant are some of the managerial implications of having such a large segment of the population unlikely to process word and number information as managers intend We believe that the incidence of functional illiteracy has strategic implications in areas such as product differentiation and new product introduction, avoidance of product liability, management of price promotions, and customer loyalty programs Functional illiteracy also has significant tactical implications for retailers and product managers Because of space limitations, we discuss some of the strategic implications next and include, without extensive discussion, an illustrative list of tactical considerations in Table 3 We link the presented implications to cognitive predilections, decision heuristics and trade-offs, and coping strategies

Product differentiation and new product introduction It is difficult to imagine a consumer goods industry in which producers do not seek a competitive advantage through new products or improvements to existing products and in which the effective communication of product offerings is not a significant challenge Billions of dollars are spent on advertising, brand management, point-of-purchase displays, and packaging to communicate what defines a product and the array of benefits such that it delivers a good value even at premium prices However, for many consumers, most of the efforts are wasted or may be misunderstood and misrepresented as a result of an overreliance on words and numbers as carriers of information to a population that processes them differently from other consumers Many functionally illiterate consumers do not process words and numbers by incorporating them into abstracted representations of the products and their categories They focus instead on a limited set of words that they process concretely, and they often base their decisions on heuristics that overemphasize single attributes and deemphasize or even ignore how new product attributes and unique characteristics deliver value at a more inclusive level For functionally illiterate consumers, strategies that add features to existing brands (e g , bleach alternatives in laundry detergents, whitening agents in toothpaste, vitamins in soft drinks) are unlikely to result in additions of the new attributes to the brands' preexisting quality and performance images A more likely outcome is that these consumers will perceive the new product as a new product category (e g , Tide Bleach, Colgate White Paste, Pepsi Vitamins) that may or may not be compatible with the brands' cultivated image In contrast, brands may be associated with attributes that are not central to their value propositions, which could lead to brand confusion instead of the intended enhancement of a brand's core characteristics Similar unintended outcomes are also possible when new brands are introduced or when brands are revitalized with changes to the fonts or colors used to represent them Our research suggests that functionally illiterate consumers are more likely to ignore new brands Moreover, if the new or revitalized brand undermines or replaces the preexisting brand as a pictorial element in its typical context and thus generates confusion, the resultant anxiety may be enough to trigger brand switching Many functionally illiterate consumers are brand loyal because of pictographic recognition

TABLE 3
Illustrative Tactical Responses for Retailers and Producers

	Concrete Reasoning		Pictographic Thinking			Decision Heuristics	Coping Strategies
	Value Trade-Off; Concretizing Tasks	Magnitude Estimation and Computing Difficulties	Sight Reading; Pictorial Recognition	Visualizes Attributes and Usage Situations	Visual Counting	Habitual Choice; Random Choice; Single-Attribute Decision Making	Dependence on Others; Self-Esteem Maintenance; Dissimulation
Retailers	Actual price presented on shelf clearly, shopping aids on retail shelf such as size graphics, visual depiction of price–size ratio on shelf	Computation aids for total basket-price management (e.g., shopping carts with scanners), dollar and cents discounts rather than fraction-off discounts	Maintain familiar store layout or ease transitions to new layout over time, familiar brand logos on store signage	Pictorial dollar and cents displays, shelf displays matched to use (e.g., Sunday dinner), carts that suggest other ingredients and locations	Fractions in pictorial form, dollar and cents discounting and displays of savings to replace fraction- and percentage-off displays	Pictorial explanations of brand logo changes if producers do not provide them, pictorial depictions of value deals	Family-friendly shopping environments, train personnel to recognize consumer needs and assist while preserving consumers' dignity
Producers	Pictorial depiction of attribute information, pictorial depiction of expiration date	Pictorial depiction of volume content in forms that do not change as does packaging	Retain familiar logos or implement smooth transitions to new logos	Pictorial depictions of unique attribute information on packages	Value propositions in visual form, price–size savings in visual form	Consumer education aids (through adult-education programs) that highlight brands and assist in teaching of safe food handling and balanced-diet needs	Family-focused brand promotion programs using "stealth" and similar promotional programs based on word of mouth

coupled with adequate brand performance When company actions compromise pictographic recognition, functionally illiterate consumers may not search the shelf for new renditions of the same brand or for product information that signals that the brand has been recast for their benefit They are more likely to seek out and purchase a competing pictorially recognizable brand

These are not insurmountable problems, but they require that producers take into account that functionally illiterate consumers do not process word and number information in the same way as literate consumers do For example, new attributes, such as bleaching agents in detergent or whitening agents in toothpaste, would benefit from pictorial representations of the benefits (e g , before-and-after laundry depictions, a smile with dazzling white teeth), along with a simple-to-process word (or words) that represent the benefit Culturally sensitive metaphors (e g , pearls for white) can also be used pictorially to take advantage of well-learned associations that may be part of an oral tradition and transcend literacy and numeracy skills Needless to say, the use of audiovisual media is important, because information processed as conversations can be used to generate a rich set of associations to which simple-to-process words can be linked

An additional tendency of functionally illiterate consumers that should be managed in the introduction of product improvements and new products is consumers' reliance on assistance from family, friends, and store personnel in making purchase decisions Without calling attention to consumer deficiencies, it may be possible to remind functionally literate helpers to recommend new and improved products to friends as a way of being helpful to others who may not be aware of the product's benefits Assuming that people who help functionally illiterate consumers do so because they care, it seems plausible that emphasizing ways they can be even more helpful will be considered compatible with their motivations and thus likely to generate positive responses

Finally, it is important for marketers to note functionally illiterate consumers' high level of advance planning and, therefore, to seek a place on their shopping list before they arrive at the store Even in highly familiar environments, it is reasonable to expect that functionally illiterate consumers are somewhat more anxious than are literate consumers, because they focus their attention on recognizing preferred products and brands pictographically amidst the tens of thousands of stockkeeping units carried by the typical store The cultivation of advance familiarity through television and radio advertising, pictorially rich billboards and posters, and even easy-to-comprehend direct mail pieces can enhance the likelihood of purchase

Avoiding product liability risks Consumer misuse of products is an ongoing concern among producers (at least in the litigious U S market), and emphasis is placed on both explaining the proper use of products to consumers and using warnings about the potential consequences of product misuse However, our research suggests that many of companies' liability avoidance practices, such as detailed warnings and instructions in multiple languages on package labels, will not be effective with functionally illiterate consumers At best, functionally illiterate consumers may ignore such warnings because they cannot process them Moreover, given functionally illiterate consumers' tendencies to fixate on single pieces of information and process them at a concrete level, it is not difficult to imagine circumstances in which liability avoidance practices may result in some consumers using the product in precisely the way that producers seek to avoid. For example, bottles of dishwashing liquid may contain claims such as "antistress" and "aromatherapy" in large, bold print, with descriptors and warnings such as "concentrated dish liquid" and "do not use with chlorine bleach" in small print Furthermore, such bottles often have pictorial representations of flowers and other aromatic ingredients on the label but no equally visible and interpretable pictorial representation of the product's intended use A functionally illiterate consumer could misinterpret a product label such as the one we have described such that he or she perceives the product as a freshener that can be used in settings that include doing laundry If combined with chlorine bleach, such a product could produce potentially harmful fumes The same could be said for over-the-counter medications that contain sweeteners (e g , throat lozenges) and a printed warning "this is not candy" on the label A functionally illiterate consumer who focuses on the sweetener content and the word "candy" could easily use the product inappropriately

Such scenarios can be replicated in the thousands, if not millions, of households and business settings around the world in which functionally illiterate consumers live and work If producers were to argue that their not knowing that such a high percentage of the population is low-literate should exonerate them, widespread availability of the National Adult Literacy Survey (Kirsch et al 1993) has weakened that argument Marketing managers need to be sensitive to functionally illiterate consumer predilections for concrete reasoning and pictographic thinking, and they should develop instructions and warnings that clearly communicate the products' intended uses and potential dangers from misuse If functionally illiterate consumers can be counted on to make decisions based on concrete reasoning and pictographic thinking, it is good business to reach consumers through those information-processing mechanisms and to avoid product liability complications by doing so

Managing price promotions In 2002, consumer promotions in the United States totaled more than $233 billion (*Promo* 2004), much of it devoted to coupons and other forms of price discounts designed to induce action at the point of purchase However, our data suggest that for many functionally illiterate consumers, such promotions are confusing and may even cause them to switch away from the promoted brands Among the functionally illiterate consumers we interviewed and observed, we found recurring and significant deficiencies in the ability to calculate accurate prices when coupons and percentage-off or fraction-off deals are used In turn, these deficiencies engender anxiety and trigger avoidance strategies in some consumers For the most part, consumer promotions are intended to enhance value to the consumer by reducing price and have been shown to result in category expansion and enhanced market

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share for promoted brands (Neslin 2002) They have also been linked to increased sales for competing brands, a phenomenon that is not always well understood Our research provides a possible factor that contributes to increased competitor sales, given that in some cases consumer promotions scare functionally illiterate consumers away from promoted brands and to competing brands Our research also emphasizes that many consumers have difficulties in calculating or even accurately estimating the value enhancement that consumer promotions are intended to provide

As with product liability concerns, careful attention to consumer predilections for concrete reasoning and pictographic thinking can lead to modes of presenting consumer promotions that will make them attractive instead of confusing and repulsive to functionally illiterate consumers Our data suggest that functionally illiterate consumers are receptive to price deals but lack the numeracy skills to estimate value from price-discount calculations However, if price and discounts are represented pictorially (e g , pie charts), it seems reasonable to expect that more functionally illiterate consumers will grasp discount magnitudes quickly and accurately Moreover, given the relatively low cost of printing customized labels, the adoption of graphical representations of price promotion information across markets and product categories is not an onerous task Our data do not enable us to estimate the dollar value of increased effectiveness from such tactics, but if a large group of consumers respond to consumer promotions adversely because of literacy and numeracy deficiencies, the returns from aligning the presentation of consumer promotions to the skills of these consumers should be substantial

Consumer loyalty programs Research into the efficacy of consumer loyalty programs has shown that because of the expense of continually satisfying customers and concurrently meeting their expectations for preferential prices, such programs are often not profitable (e g , Reinartz and Kumar 2000, 2002) Companies spend large amounts of money to keep track of customer purchases, to stock the products they favor, and to design consumer promotions to keep regular consumers satisfied, it is far from clear that such investments generate positive returns This may be caused by consumer expectations that loyalty should be rewarded with lower prices, given that most other aspects of shopping environments are indistinguishable from those offered elsewhere However, when it comes to functionally illiterate consumers, our research suggests that differentiation is possible through actions such as store signage designed to have pictorial information alongside word information, limited changes to store layout whenever possible, employee training in sensitivity to consumers who display literacy and numeracy deficiencies, and implementation of safeguards against functionally illiterate consumers' exploitation by unscrupulous employees For example, the understanding revealed by Garvey's favorite cashier should not be left to chance but should be part of employee training in markets in which one in four customers may be functionally illiterate Our research further suggests that functionally literate consumers who find safe and amenable shopping environments are loyal and are not likely to expect discounted prices for their patronage Among functionally illiterate consumers, there are many who greatly appreciate shopping environments that respond to their needs for pictorial information, help protect their interests and self-esteem, and seek to reduce the stress of shopping Consequently, such consumers represent an untapped opportunity for at least some retailers to generate loyalty from a consumer group with documented spending power and whose behaviors suggest that they can be profitable

The solutions that marketers devise for functionally illiterate consumers may sometimes coincide with solutions for various other groups, such as novice consumers, time-constrained consumers, consumers in developing countries, and consumers shopping in unfamiliar environments (e g , foreign countries) There appears to be a strategic overlap between catering to functionally illiterate consumers and catering to other significant consumer segments in the global marketplace However, the surface-level similarities between groups may hide deeper differences that marketers need to address, as our comparison groups illustrated

Further Research and Limitations

Our findings also point to some specific directions for further research For example, pictographic thinking has implications for visual information processing If attribute information that is presented pictorially is processed differently, it is likely to have unexplored effects on decision making and memory In addition, the conditions under which functionally illiterate consumers use different types of decision heuristics and coping strategies need to be identified Similar arguments can be made for concrete reasoning In every area depicted in Figure 2, functionally illiterate consumers respond differently than do literate consumers, and their thinking and behavior needs to be better understood

Cross-cultural research on functionally illiterate consumers would also be beneficial, given the large segments of immigrant and illegal-alien functionally illiterate consumers in the Canadian, European, and U S markets and the even greater numbers of functionally illiterate consumers in the global marketplace Such research should be conducted in cultures that vary in overall levels of literacy and in their marketing infrastructure, given that functional illiteracy is context determined Other notable cross-cultural research questions include How do both low-literate buyers and sellers, not uncommon in developing contexts, negotiate the marketing environment? Are the emotional and coping phenomena observed in industrialized economies replicated, if not, what takes their place? Finally, the combined and overlapping effects of functional illiteracy and language deficiencies, such as those with ESL consumers, must be studied in order to better understand consumer behaviors in ethnically diverse markets

At a managerial level, the effects of levels of functional literacy on several phenomena also merit additional research For example, the effects of illiteracy on the processing of nutritional and health claims should be clearly understood Equally important is the influence of functional illiteracy on consumer relationships with store personnel and on the efficacy of customer service Functional literacy is taken for granted throughout much of the marketing management literature The prescriptions of most extant research need to be examined for their applicability to functionally illiterate consumers, with the objective of developing an enhanced understanding and more appropriate theories and practices

Our study has several limitations that temper its implications First, our functionally illiterate informants are likely to be different in level and type of motivation from ones who are not enrolled in adult-education programs Respondents in our study are trying to overcome literacy and numeracy deficiencies, which suggests that they are highly motivated and possibly quite different from functionally illiterate consumers who are not seeking to become literate This is another topic on which additional research is needed, though our experiences with accessing students enrolled in adult-education centers suggest that even greater difficulties are possible in trying to reach nonstudent samples

Second, although we combined multiple research methods, their scope was limited by the inherent difficulty of functionally illiterate consumers to deal with objective methodologies such as surveys and experiments There is certainly more going on in the minds of functionally illiterate consumers than our interviews and observations can reveal, though we deliberately focus on behaviors and outcomes that we repeatedly observed Whereas large-scale self-administered surveys remain unrealistic in studies of functionally illiterate consumers, the careful use of well-designed experiments and personally administered surveys may be worth exploring

A final limitation pertains to the authors' tacit biases Even with training and self-monitoring, we remain functionally literate consumers examining a world with which we cannot cognitively and emotionally relate There is probably much that we missed about how functionally illiterate consumers navigate modern shopping environments that must be explored by further research

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Itamar Simonson

Determinants of Customers' Responses to Customized Offers: Conceptual Framework and Research Propositions

Marketers have been challenged by proponents of individual (one-to-one) marketing to shift from focusing on market segments to making individually customized offers Building on current knowledge regarding the construction of customers' preferences, the author examines the basic assumptions underlying individual marketing and presents a process model of customers' responses to customized offers The model addresses (1) preference development, (2) evaluation of customized offers, (3) likelihood of purchasing the customized offers, and (4) maintenance of relationships with one-to-one marketers The analysis leads to specific propositions regarding determinants of customers' responses to customized offers The author discusses future research directions and managerial implications

Over the past decade, marketers have been challenged to change their old, inefficient ways and take advantage of new technologies to offer individual customers exactly what they want In their best-selling *Harvard Business Review* article titled "Do You Want to Keep Your Customers Forever?" Pine, Peppers, and Rogers (1995, p 103) argue that "Customers, whether consumers or businesses, do not want more choices They want exactly what they want—when, where, and how they want it—and technology now makes it possible for companies to give it to them " Similarly, marketing textbooks (e g , Kotler 2000) and instructors have emphasized the importance of individual marketing, and new tools and management approaches have been introduced to enable marketers to serve the wants of individual customers better A prominent example of such approaches is one-to-one marketing (e g , Peppers and Rogers 1993, 1997, Peppers, Rogers, and Dorf 1999), and the emphasis on customizing offers to individual customer preferences is also a key component of mass customization (Gilmore and Pine 1997, Pine 1993), customer relationship management (e g , Freeland 2003, Lemon, White, and Winer 2002, Winer 2001), personalization, and smart agents (e g , Alba et al 1997, West 1996, West et al 1999)

Although each of these management approaches has its unique aspects, a common underlying assumption is that customers have hidden or overt preferences that marketers can reveal by building a learning relationship (Peppers and Rogers 1997) After uncovering customers' preferences, marketers can offer them what they want, often even before customers know they want it (e g , anticipate which shoes, eyeglasses, or greeting cards the customer will prefer) If successful, marketers will be rewarded for the superior value they provide with higher customer loyalty, which will create a "literally insurmountable barrier to competition, for one individual customer at a time" (Peppers and Rogers 1997, p 177) Indeed, in theory at least, serving "segments of one" cannot be less effective than serving larger segments, unless the additional benefits are outweighed by the additional costs Learning individual customer preferences and tailoring offers to those preferences is not a new concept and has been the standard practice in many service, business-to-business, and other markets However, new technologies now enable marketers to apply individual marketing using mass customization in a much wider range of markets

Offers that are customized to individual customers' preferences may provide superior value if customers have preferences that marketers can uncover and if customers can recognize offers that provide a superior fit to their preferences However, recent research on the construction of preferences (e g , Bettman, Luce, and Payne 1998) suggests that customer preferences are often ill defined and susceptible to influence by seemingly irrelevant factors Therefore, the fundamental assumptions underlying the new approaches for satisfying individual customer preferences often may not hold—customers may not have well-defined preferences to be revealed, and they may fail to appreciate customized offers that fit their measured preferences Furthermore, when customers do not have well-defined preferences, they may need to rely on various proxies or cues to assess whether an individual offer indeed fits their preferences

Therefore, a question that arises is whether and, more specifically, under what conditions preferences can be uncovered and translated into superior customized offers that are appreciated and rewarded by the customer The pre-

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Itamar Simonson is Sebastian S Kresge Professor of Marketing, Graduate School of Business, Stanford University (e-mail itamars@stanford edu) The article has benefited from the comments of Dan Ariely, John Deighton, and Thomas Kramer

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sent research addresses this question and examines the factors that determine customers' evaluation and acceptance of customized offers and one-to-one relationships with marketers The focus is on situations in which an individual customer's preferences for the focal product or service are first measured or tracked and the information is then used to design offers tailored for that customer Although the distinction between what has been referred to as individual marketing and market segmentation is subtle (e g , many examples of one-to-one marketing could also be classified as usage-based segmentation), this research does not focus on approaches that can be regarded as traditional customer segmentation

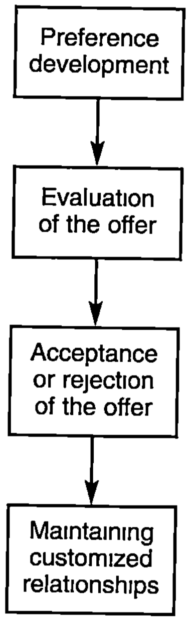
The discussion follows the process model summarized in Figure 1 The first component, preference development and stability, underlies customers' evaluations and acceptance of and responses to customized offers The next component, evaluation of customized offers, refers to factors that affect the perceived fit and attractiveness of the offer However, the likelihood of customers actually accepting a recommendation or purchasing the offer (holding fit and attractiveness constant) may depend on the specific characteristics of the customized offer and the category Finally, this research examines influences on the customer's decision to maintain one-to-one relationships and to continue to purchase previously customized offers The theoretical and managerial implications of this research are discussed

Preference Development: Stability and Clarity of Customers' Preferences as Antecedents of Responses to Customized Offers

The characteristics of customers' preferences are the antecedents to and main drivers of the response to marketers' offers, including individually customized offers The emerging consensus among researchers of consumer decision making is that buyers often do not have well-defined preferences that can be retrieved, and they construct their preferences when faced with the need to make decisions (for a review, see, e g , Bettman, Luce, and Payne 1998, Fischhoff 1991, Slovic 1995) The notion that preferences are constructed rather than retrieved is supported by a great deal of evidence indicating that preferences are contingent on the framing of options (e g , Levin and Gaeth 1988), the characteristics of the decision task (e g , Tversky, Sattath, and Slovic 1988), and the choice context (e g , Huber, Payne, and Puto 1982) For example, Simonson and Tversky (1992) demonstrate that consumers are more likely to exchange $6 for an elegant Cross pen when they also have the option of exchanging $6 for a less attractive pen

It is noteworthy that the conclusion that preferences tend to be unstable and susceptible to various influences does not apply equally to all preference levels In particular, much of the research supporting the notion that preferences are constructed and susceptible to a variety of seemingly irrelevant influences has involved options with different attribute values that were in the same product or service category In contrast, although choices between options in different categories can be difficult and susceptible to influence, preferences for product or service categories or types tend to be more stable and well defined For example, consumers' likings or dislikings for smoking, plain yogurt, or gambling are likely to be rather stable over time, and consumers are likely to be well aware of their preferences for such product types

FIGURE 1
Constructed Response to Customized Offers: An Overview of the Process Model


Preference development
Evaluation of the offer
Acceptance or rejection of the offer
Maintaining customized relationships

The notion that customers' preferences are often constructed rather than revealed has potentially important implications for the effectiveness of customizing offers to individual tastes Such approaches would offer the greatest value to the customer and, correspondingly, the greatest advantage to the customizing marketer if the following conditions were to hold (1) customers have well-defined and reasonably stable preferences, (2) the customers themselves cannot easily define their precise preferences or identify the available options that offer them the best fit, (3) by gathering information about individual customers, marketers can reveal preferences and use the information to customize their offers given those preferences, and (4) customers can recognize and respond favorably to offers that fit their revealed preferences

The first condition is straightforward It is easier to satisfy well-defined, stable preferences than fuzzy preferences that are susceptible to influence by contextual, framing, and task factors That is, if preferences are stable and well defined, a technique that effectively reveals those preferences will enable a marketer to generate a customized offer that accurately matches the customers' wants The second condition is less straightforward Consider a typical market in which there is more than one supplier that can potentially provide the same service or product In that case, if customers have well-defined and stable preferences, the more insight they have into their preferences, the less dependent they are on the private information of a particular marketer, and the easier it is for them to select the most attractive competitive offer That is, knowledge of their own preferences gives customers greater independence, though even customers with good preference insight can benefit from assistance in identifying suitable options

The third condition for effective customized offers is again more straightforward—a one-to-one marketer should be able to use information about the customer's preferences (e g , based on prior purchases) to generate an offer that fits future preferences However, as is discussed further subsequently, this is a challenging task Finally, suppose that the consumer has well-defined preferences but does not have good insight into those preferences In that case, even if the marketer or agent can learn the true preferences of the customer and translate them into a customized offer, the customer may fail to recognize the attractive offer That is, because customers often do not have good insight into their preferences (e g , Nisbett and Wilson 1977), they may fail to recognize a good match to their measured preferences

This analysis suggests that there are two dimensions of consumer preferences that play key roles in the response to customized offers (1) the degree to which consumers have stable, well-developed preferences and (2) the consumers' self-insight into those preferences, including their perception of the stability and clarity of their preferences Although both dimensions reflect continuums rather than dichotomies, to simplify the analysis it can be assumed that consumer preferences in a particular category fall into one of four cells, as shown in Figure 2

The degree to which preferences are stable and well developed and the self-insight into those preferences are likely to be positively correlated For example, consumers are likely to have stable preferences for product types (e g , plain yogurt, strawberry jam) and good insight into those preferences In addition, more knowledgeable and experienced customers are likely to have both better-developed preferences and better insight into those preferences than are less knowledgeable and experienced customers However, the two factors may diverge in many cases In particular, customers might believe that they have preferences, but such beliefs are incorrect Combining the two dimensions of consumer preferences, four basic groups can be defined (see Figure 2)

FIGURE 2
Preference Development: Customer Classification Based on Preference Stability and Insight

		Customer Preferences	
		Unstable, poorly developed	Stable, well developed
Insight into Preferences	Poor	Group 1	Group 3
	Good	Group 2	Group 4

Group 1	If customers have unstable and fuzzy preferences, it is impossible to offer them a solution that provides a satisfactory fit to their (unstable, weak) preferences However, because these consumers have poor insight into their preferences, they are susceptible to influence and could be convinced that a customized offer is satisfactory and fits with what they like If the customized offer does not fail, these consumers may later define their preferences on the basis of the option that they mistakenly believed fit their prior preferences For example, a consumer may be unable to distinguish between merlot and cabernet sauvignon wines in a blind taste test yet believe that merlot is superior In that case, a customized offer of a merlot wine may create a more stable preference for merlot wines
Group 2	Customers who know that they do not have stable, well-defined preferences are likely to evaluate offers on the basis of their apparent attractiveness rather than their fit with (weak) preferences Furthermore, these customers are likely to be most receptive to advice and assistance in defining their preferences For example, motivated wine drinkers who recognize their ignorance in wines are likely to be receptive to education and suggestions
Group 3	This group of customers is probably the smallest It represents customers who have stable preferences that guide their choices, but they have poor insight into the drivers of their preferences For example, consumers might believe that their choices are based on rational, objective criteria, even though their decisions are based primarily on affective or aesthetic considerations Consequently, these customers may mistakenly accept customized offers or choice criteria that do not really fit their preferences, which leads to dissatisfaction Alternatively, they might reject customized offers and choice criteria that actually do fit their preferences
Group 4	Customers in this group have both well-defined preferences and good preference insight, which enable them to judge correctly whether a customized offer fits their preferences Thus, such customers might be good candidates for customized offers, and they may be more satisfied with marketers that make an effort to learn their preferences However, given their insight into their preferences, they are likely to be less dependent on marketers' recommendations, and if needed, they can teach other marketers how to satisfy their preferences

Note that the same customer may fall into different preference classification groups, even within a category In particular, preferences for product types are more likely to fall in Group 4 (well-developed preferences and good insight) than are preferences for specific options within a category Thus, usage information at the individual customer level is likely to be a better predictor of future preferences for product types than for specific options

Given that consumers' preferences are often undeveloped and unstable to at least some significant degree and customers tend to have limited insight into their own preferences, the main focus of the present analysis is customers in Groups 1 and 2 in Figure 2 In addition, the factors influencing the response to and impact of customized offers among consumers with well-developed preferences and a good insight into those preferences (i e , Group 4) are examined

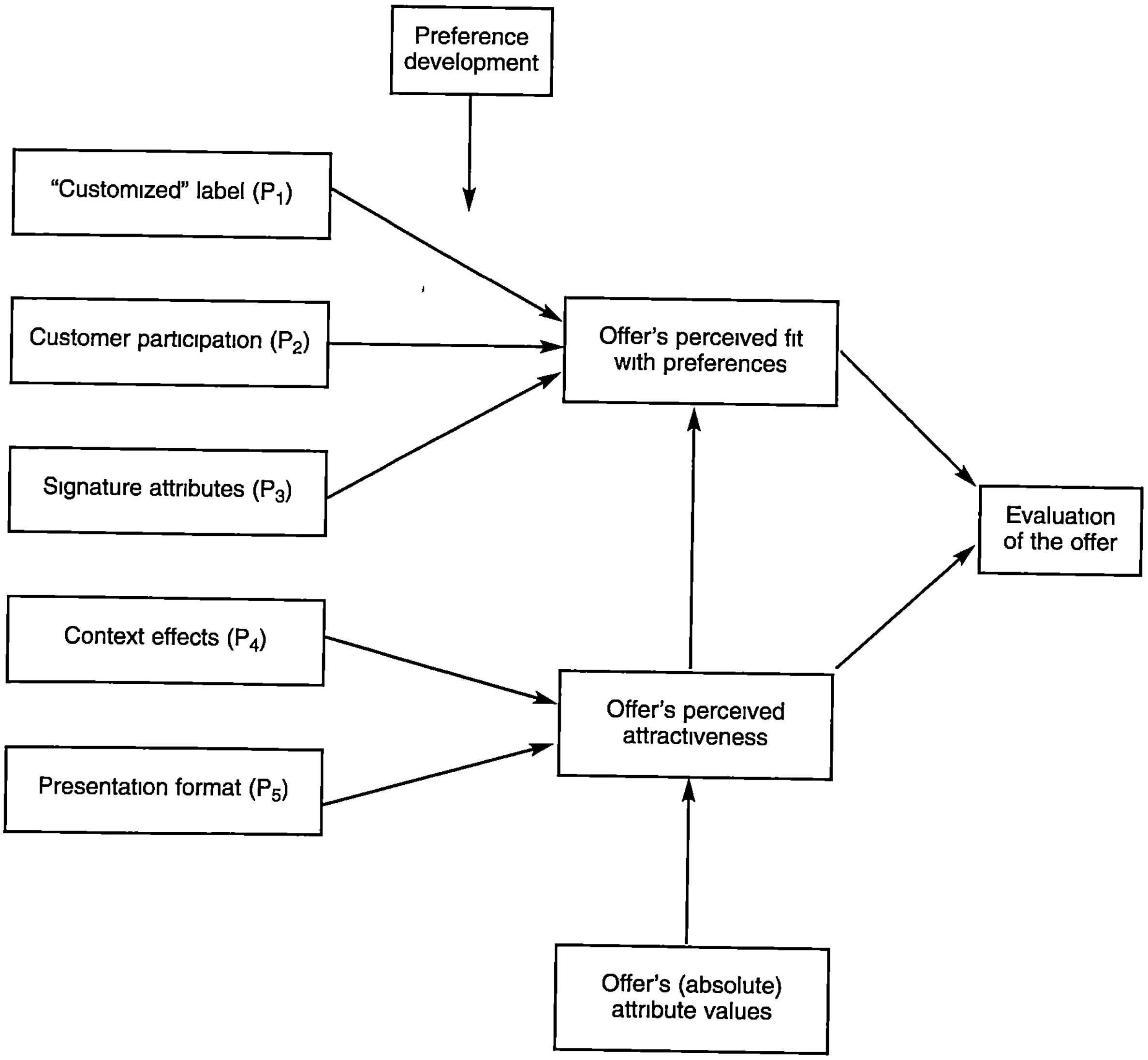
Evaluations of Customized Offers Under Preference Uncertainty

Customers whose preferences are (at least somewhat) fuzzy and unstable but who believe that they have preferences (i e , Group 1 in Figure 2) are likely to rely on cues for assessing the fit of a customized offer with their preferences Thus, under preference uncertainty, customers' evaluations of the attractiveness of a customized offer are likely to be influenced significantly by the manner in which it is presented Figure 3 depicts key drivers of the evaluation of customized offers, which are discussed next

Influences on the Perceived Preference Fit of Customized Offers

The "customized" label effect Perhaps the most basic fit cue is the presentation of an offer as customized to the individual customer's tastes Specifically, given that customers often do not have well-defined preferences or good insights into their preferences, the "customized" label, by itself, can positively affect perceived fit, assuming that the customer trusts the one-to-one marketer or agent Prior research has identified several key antecedents of trust, including the supplier's expertise, reliability, and motives (e g , Moorman, Zaltman, and Deshpandé 1992) Accordingly, the evaluation of an offer by a marketer or agent that

FIGURE 3
Influences on Customers' Evaluations of Customized Offers


Preference development
"Customized" label (P_1)
Customer participation (P_2)
Signature attributes (P_3)
Context effects (P_4)
Presentation format (P_5)
Offer's perceived fit with preferences
Offer's perceived attractiveness
Evaluation of the offer
Offer's (absolute) attribute values

Notes The proposition related to each component appears in parentheses is presented as customized to the individual customer's tastes is likely to depend on the degree to which the marketer is regarded as a competent and reliable customizer with access to attractive solutions (e g , has the technology to identify the best deals on the Internet)

Furthermore, the impact of a "customized" label on perceived fit is likely to be mediated by a confirmation bias (e g , Lord, Ross, and Lepper 1979) Specifically, if customers trust the marketer or agent and believe that it has information about their true preferences, they will be inclined to interpret even ambiguous evidence as consistent with the "customized to your preferences" label For example, when evaluating a wine presented as based on their previous selections, trusting consumers may find evidence that the "customized offer" indeed fits their preferences This leads to the first proposition

> P_1 An offer presented as customized to the customer's preferences will be perceived as providing a superior fit, compared with the same offer without the customization label, assuming that (1) the customer trusts the marketer and (2) there is ambiguity about preference fit

Customer participation in the design of customized offers as a moderator of perceived fit In some cases, a marketer informs the customer that a particular offer is individually customized, whereas in other cases a customer is unaware that an offer was derived from his or her preferences and profile (e g , the marketer tracks and uses the customer's prior preferences to generate an offer but does not reveal that practice to the customer) In other situations, customers both are aware that an offer was customized to their tastes and actively participated in the offer's design Such participation is likely to be a particularly powerful cue that the offer fits the customer's preferences Thus, for example, the success of mass customization as applied by Dell Computer, in which customers select the product attribute values they want, can be partly due to the customers' participation in designing the provided products

Recent research by Kramer (2003) provides indirect evidence in support of the proposition that, other things being equal, an offer that was produced with the active participation of the customer would be perceived as offering a better fit to the customer's preferences Kramer argues that the effect of preference measurement on a customer's perceptions of the fit of an offer is likely to depend on whether the customer can detect the correspondence between the preferences expressed in the measurement process and the customized offer Consistent with this proposition, Kramer shows that respondents who provide direct measures of attribute importance weights and partworth values (Srinivasan and Park 1997) evaluate an individually customized option more favorably than do respondents whose preferences have been measured with full-profile conjoint analysis, a decompositional approach that is less transparent to respondents

In a similar fashion, active participation of customers in the production of offers customized to their tastes is expected to make the fit between the offer and the customers' preferences more transparent However, the degree to which active customer participation affects perceived offer fit is likely to depend on customers' perceptions of their own preferences and their familiarity with the category and the options available on the market Specifically, customers who believe that they have strong, well-defined, and informed preferences are likely to place greater value on their participation in the process than are customers who are less sure that they know what they want However, stronger preferences and greater category familiarity also enable customers to evaluate more accurately the true fit of the customized offer with their preferences Thus, the role of the strength and clarity of preferences in moderating the impact of active participation in the offer's production on its perceived fit depends on the relative weights of two conflicting factors the strength of belief that the customer's input to the offer design is important and the customer's ability to evaluate the offer's true fit with his or her preferences

> P_2 Customized offers produced with the customer's participation in the customization process (holding the offer's specifications constant) will be perceived as providing a better fit to the customer's preferences than will customized offers produced without the customer's participation The magnitude of this effect depends on (1) the degree to which customers perceive their input to the offer production process to be well informed and thus important and (2) customers' ability to evaluate the true fit of the offers with their preferences

Key preference fit indicators Customers' preferences can be divided into those that are shared by many other customers and those that are perceived as idiosyncratic to the customer or to a small segment Kivetz and Simonson (2003) show that idiosyncratic preferences play a key role and tend to be overweighted in consumers' decisions For example, Kivetz and Simonson demonstrate that students who like sushi more than most other students do are more likely to join a loyalty program that offers a certain reward (movie tickets) for purchasing both 12 sandwiches and 12 orders of sushi than to join a loyalty program that offers the same reward for purchasing just 12 sandwiches Similarly, when evaluating a customized offer, customers are likely to overweight the offer's fit on their "signature" preferences, which they believe separate them from most other customers That is, a match or mismatch on an attribute that is idiosyncratically important to the customer can often determine the offer's perceived attractiveness

> P_3 A fit (or misfit) of a customized offer on customers' signature (idiosyncratic) attributes will be overweighted in the evaluation of the offer, compared with equal or more important preference dimensions that are perceived to be as important to many other customers

Moderators of the Perceived Attractiveness of Customized Offers

As discussed previously, many customers may be aware that their preferences are not well defined (i e , Group 2 in Figure 2) Accordingly, when customers are presented with offers that are (presumably) customized for them, they are likely to focus on the attractiveness of the offer rather than on its fit with their (ill-defined) preferences Furthermore, the perceived attractiveness of an offer is likely to affect its perceived preference fit among consumers with unstable, poorly developed preferences, who may mistakenly believe that they have well-defined preferences (Group 1 in Figure 2). Primary influences on perceived offer attractiveness (aside from the obvious effect of superior attribute values, such as lower price or higher reliability) are expected to include the set configuration and format of the presented customized offers.

The customized offers' presentation context. A great deal of research has shown that customers tend to evaluate options relative to the (local) choice set presented to them, giving surprisingly little consideration to the other options available on the market (e.g., Huber, Payne, and Puto 1982; Simonson 1989). Accordingly, assuming that marketers present customers with more than one option that is customized to their tastes (e.g., three "recommended" options), they can present a set of options that will make a particular option appear attractive compared with the other presented options. Particularly when customers do not have clear, strong preferences, one option appearing superior to other presented alternatives can convince customers that this target option offers a good fit and is a good buy. However, if customers perceive a recommended, less attractive option as a mere decoy that is designed to make another option appear like a bargain, this strategy will backfire and diminish customers' trust in the one-to-one marketer.

P$_4$: Customized offers that seem attractive in the context in which they are evaluated will be perceived as offering a superior fit to the customer's preferences. This effect will be strong for customers with less developed preferences and those who perceive the context to be credible.

The customized offers' presentation format. Customized offers may take different forms. The marketer might offer the customer just one option that best fits that customer's preferences. Alternatively, the marketer might provide the customer with several suitable options, rank-ordering them in terms of fit or value or just presenting them as a set of options that fit the customer's preferences or profile. Prior research suggests that the presentation format used and the number of options presented can have a significant effect on customers' response, including both whether a choice will be made and which option will be selected (for a review, see Bettman, Luce, and Payne 1998). In particular, presenting the customer with two about equally attractive alternatives, as opposed to just one recommended option, may often produce conflict and make it difficult for the customer to identify one offer as clearly attractive, leading to indecision (e.g., Dhar 1996, 1997; Tversky and Shafir 1992). Furthermore, Iyengar and Lepper (2000) demonstrate that presenting consumers with a large set of options decreases the likelihood that any single option will be perceived as sufficiently attractive to justify a purchase.

However, a limitation of presenting just one customized option is that the customer may have difficulty evaluating whether the recommendation represents a good value, because customers tend to rely on comparisons among the options shown to them to assess value (e.g., Huber, Payne, and Puto 1982; Simonson and Tversky 1992). Therefore, there is a higher likelihood that customers will purchase a customized option if they are presented with two or more options and they perceive one recommendation as superior to another (legitimate) option.

Presenting a set of options that are rank-ordered in terms of fit to the customers' tastes has the advantage that it offers customers several customized options to choose from, while reducing the conflict associated with choice among multiple alternatives. However, presentation of rank-ordered recommendations can backfire if the customer has a prior unfavorable opinion of the option ranked first. For example, a customer may already be familiar with and dislike the recommended book or wine ranked first, in which case the customer may become skeptical of the value and accuracy of the customization process. Furthermore, customers may be reluctant to select an option that is ranked lower than one they do not like.

P$_5$: Customers are more likely to perceive an offer as attractive and as offering a good fit if they are presented with a set of rank-ordered recommended options, as opposed to just the top-ranked alternative or a set of unranked alternatives. If, however, they have a prior negative opinion of the top-ranked alternative, they are more likely to accept an offer if recommended options are unranked.

Moderators of Customers' Purchases of Customized Offers

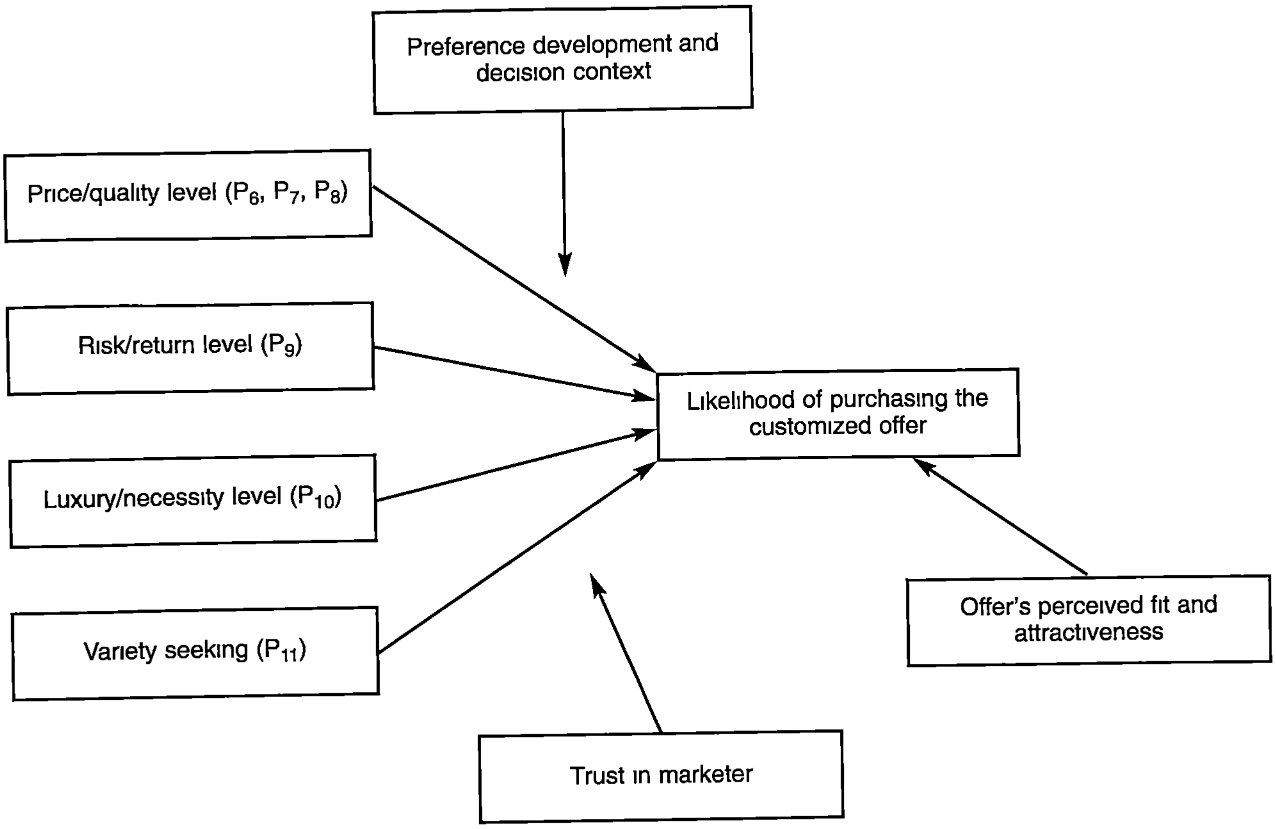
Beyond the evaluation of an offer's fit and attractiveness, a critical question is whether customers will actually accept or purchase the offer. In particular, are customers inherently more receptive to recommendations of certain option types? Although this question has not received much attention, recent research suggests that, if the attractiveness of an offer is held constant, the impact of recommendations on customer action (or purchase decisions) depends on the characteristics of the recommended options (e.g., their price, quality, and risk).

Customized recommendations may also be more effective for certain product categories and types of purchases. For example, recommendations may be made for categories such as books or movies, in which consumers make frequent selections of product variations, or for infrequently purchased products, such as cameras and laptop computers. Again, customers might be more receptive to recommendations in some categories than in others. Figure 4 presents key influences on the likelihood of customers acting on or purchasing customized offers.

The Effect of the Customized Option's Characteristics on Purchase Likelihood

Customers' receptivity to high-price, high-quality versus low-price, low-quality recommendations. A basic dimension on which products and services often differ is price and quality (broadly defined), such that customers might be presented with a customized high-price, high-quality brand or a low-price, low-quality brand. Prior research suggests that it is easier to cause consumers to switch from a low-price, low-quality to a high-price, high-quality option (e.g., in response to a sale) than to switch in the opposite direction (e.g., Heath et al. 2000; Nowlis and Simonson 2000).

FIGURE 4
Influences on Purchases of Customized Offers


Preference development and decision context
Price/quality level (P_6, P_7, P_8)
Risk/return level (P_9)
Luxury/necessity level (P_{10})
Variety seeking (P_{11})
Likelihood of purchasing the customized offer
Offer's perceived fit and attractiveness
Trust in marketer

Notes The proposition related to each component appears in parentheses

Simonson, Kramer, and Young (2004) demonstrate that this generalization is not limited to the effect of sales and that across a wide range of conceptually distinct conditions, consumers are more likely to switch to high-price, high-quality options For example, consumers who observe another consumer choose a high-price, high-quality option are more likely to select a high price, high-quality option, whereas observing another consumer choose a low-price, low-quality alternative often has little effect on purchase decisions These findings suggest that consumers are more likely to accept or act on customized offers and recommendations of high-price, high-quality alternatives Conversely, customized offers to choose low-price, low-quality products are less likely to cause customers to change their purchase decisions

P_6 Other things being equal, customers are more likely to accept recommendations to choose a high-price, high-quality option than a low-price, low-quality option

Although P_6 suggests a main effect whereby customers are more likely to accept a customized recommendation to choose a high-price, high-quality option, the magnitude of this effect is expected to interact with two factors the level of trust in the marketer making the customized offer and the manner in which the recommended options are presented It is reasonable to expect that acceptance of a marketer's recommendation to purchase a more expensive item requires a higher level of trust than adoption of a customized recommendation to purchase a less expensive product Specifically, because of the inherent ambiguity about quality and the typically greater profitability (for the seller) of high-price options, accepting a recommendation to pay more for a high-quality option requires that the customer trusts the marketer In contrast, a low price is less ambiguous and appears to go against the seller's profit incentive, which is likely to make the recommendation more credible and therefore less dependent on trust Accordingly, the main-effect prediction that customers are more receptive to customized recommendations to choose a high-price, high-quality option is qualified by an interaction with the level of trust

P_7 The tendency to accept recommendations to choose a high-price, high-quality option is positively correlated with the level of the customer's trust in the marketer

Prior research also suggests that when customers evaluate each alternative separately compared with two or more options jointly, they are more likely to prefer high-price, high-quality brands (e g , Nowlis and Simonson 1997) Furthermore, when customers are presented with three or more options compared with just two, they tend to avoid the lowest-price, lowest-quality alternative (e g , Simonson, Nowlis, and Lemon 1993) These results suggest that the number of customized options shown to customers is likely to influence their choices Specifically, (1) customers are more likely to purchase a high-price, high-quality alternative presented as a separate recommendation ("the best option for you"), and (2) customers are least likely to choose the cheapest alternative when it is presented simultaneously with two or more other recommended options

> P_8 Customers are more likely to accept a recommendation for a high-price, high-quality product if that option is presented separately, they are least likely to accept a recommendation to choose a low-price, low-quality option when it is the lowest-price, lowest-quality alternative in a set of three or more recommended options

Customers' receptivity to high-risk, high-return versus low-risk, low-return customized recommendations Recent research (Simonson, Kramer, and Young 2004) suggests that in choices between low-risk, low-return and high-risk, high-return options, customers tend to choose the safe option by default Furthermore, various manipulations, such as high involvement and observation of others' choices, often cause consumers to switch from a low-risk, low-return alternative (e g , using a proven but more limited technology) to a high-risk, high-return alternative (e g , the next-generation technology), conversely, it is often more difficult to change customer choices from a high-risk, high-return option to a low-risk, low-return alternative These findings, consistent with the notion that customized recommendations decrease the perceived uncertainty about the riskier option, suggest that customized recommendations that endorse high-risk, high-return alternatives are more likely to influence customers' purchase decisions However, this prediction is also expected to depend on the level of trust in the customizing marketer Specifically, the lower the customer's trust in the marketer making the recommendation, the lower is the likelihood that the customer will accept a risky recommendation, and vice versa

> P_9 In response to a customized offer, customers are more likely to switch from a low-risk, low-return to a high-risk, high-return option than to switch in the opposite direction This prediction interacts with the level of a customer's trust in the marketer Lower trust is associated with a lower willingness to accept a risky recommendation

Customers' receptivity to recommendations of luxuries versus necessities Consumers often need to choose between spending money on necessities (e g , savings, education, food) or buying luxuries (e g , fancy food, a cruise, an expensive bottle of wine) that go beyond the indispensable minimum but add to their quality of life Kivetz and Simonson (2002) show that many consumers have difficulty choosing a luxury over a necessity and consequently feel that they tend to underconsume hedonic luxuries (see also Scitovsky 1992) To remedy the tendency to reject luxuries in favor of easy-to-justify necessities, consumers may precommit to luxury consumption For example, approximately 30% of women who were offered a reward for their participation in a study chose to receive a day spa coupon worth \$70 over \$75 in cash These findings suggest that consumers often need reinforcement to allow themselves to splurge and choose luxuries over necessities In particular, compared with the default choices that consumers would have made on their own, customized recommendations to select a luxury over a necessity are likely to have greater impact than recommendations to prefer the necessity This effect is expected to be more pronounced if the recommended luxury options are offered at a discount (e g , on sale), which makes it easier for consumers to justify such choices

> P_{10} Recommendations to choose hedonic luxuries, compared with utilitarian necessities, are expected to have greater impact on the choices consumers make This effect is stronger if the recommended option (luxury or necessity) is offered at a discount

The Effect of Purchase Type and Variety Seeking on Response to Customized Offers

The propensity to accept or reject customized offers is also likely to depend on the nature and degree of variety seeking in the product or service category In some cases, customers seek no variety at all and habitually purchase the same item without considering other options (e g , Bettman 1979) In such cases, customization means that the marketer provides the customer with the usual choice without waiting for the customer to ask for it, and the customer accepts the offer

In other categories, customers do seek variety, but the set of considered options is bounded For example, customers may have a set of several flavors of yogurt or types of cereal that they purchase from time to time Because the selection of a particular item depends on the customer's current state of mind (e g , mood), customization is unlikely to be effective That is, given that no algorithm or model of the customer's prior preferences or preferences of similar customers can predict transient, state-dependent preferences, the likelihood that the customer will accept a customized offer corresponds to the probability that the customer happens to be in the state of mind that fits the offer

In yet other situations, customers seek variety, and the set of options is effectively unbounded For example, in categories such as books, movies, and wine, consumers often seek variety from a large and ever-expanding set of options In this type of purchase decision, the role of customized offers is to identify and suggest attractive options of the type preferred by the customer For example, if a consumer likes autobiographies or California cabernet sauvignons that cost around \$20, the customizer may suggest attractive new options in these categories The main focus of the seller's message needs to be indicators or evidence that, in addition to being in the relevant category, the proposed option is indeed attractive For example, informing a customer that many other customers purchased a particular autobiography and rated it highly is likely to enhance the probability that the customer will accept the (customized) recommendation

Finally, in infrequently purchased categories in which specifications and features evolve over time (e g , durable products), the customer's prior preferences are unlikely to provide much guidance to the marketer (and the customer) regarding the best offer Accordingly, a key role of the customizer is to find out, in as much detail as possible (given preference insight limitations), the features desired by the customer and use that information to identify the most attractive options available on the market However, persuading the customer to purchase a recommended, customized offer in an infrequently purchased product category can be challenging for at least three reasons

First, given the financial and other sources of risk, the customer is likely to seek further evidence (e g , expert reviews) in support of the recommended option Second, regardless of whether customers have well-developed preferences and good insight into those preferences, they are more likely to accept an offer that is customized to their tastes if they trust the customization process Specifically, when a product is purchased infrequently, it is clear that the customizer cannot rely on the revealed preferences of the customer Instead, the marketer or agent must elicit the current preferences of the customer and use that information to identify the best available options However, if customers believe that they do not have sufficient knowledge or clear preferences, they are likely to be skeptical of recommendations derived from those preferences Third, because infrequently purchased goods are often associated with high prices and profits for the seller, the risk that a one-to-one marketer has ulterior motives when making customized recommendations is high For all these reasons, customers are less likely simply to accept a customized offer in a high-price, infrequently purchased category Instead, they might use the recommendations as one source of information and further examine the product using other sources To the extent that these customers are susceptible to a confirmation bias (e g , Lord, Ross, and Lepper 1979), the customized recommendations could still exert an impact on the final purchase decision This discussion leads to the following general proposition

P_{11} The purchase type and the degree of variety seeking affect customers' acceptance of recommended customized offers Specifically, (a) higher variety seeking decreases receptivity to customized offers, and this effect is more pronounced if variety seeking is driven by transient states and tastes, and (b) for infrequently purchased high-price items, the willingness to accept customized recommendations is positively correlated with the strength of independent evidence supporting the customized recommendation

Maintaining Relationships with Marketers That Customize Offers

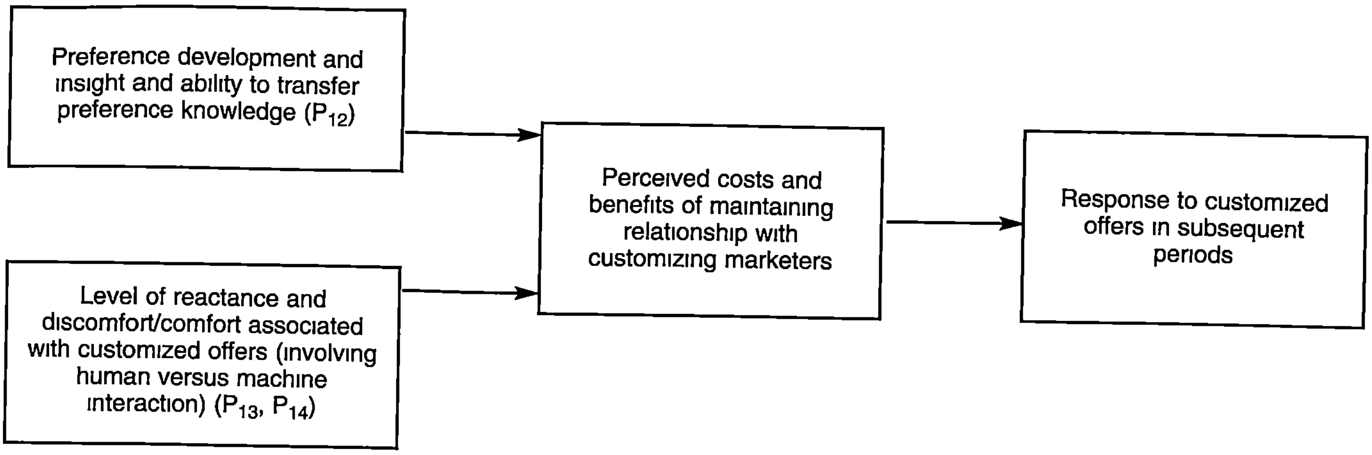
The determinants of customers' interest in and commitment to relationship marketing have been examined extensively in prior research (see, e g , Bhattacharya and Bolton 2000, Dowling 2002, Garbarino and Johnson 1999, Gundlach, Achrol, and Mentzer 1995, Morgan and Hunt 1994, Sheth and Parvatiyar 1995) In the context of the present research, the question of interest is related to a narrower issue the effect of a marketer's investment in learning the customer's preferences and designing a customized offer on the likelihood that the customer will continue to purchase from the marketer As indicated previously, proponents of one-to-one marketing and related approaches have argued that developing learning relationships with customers and using information about customers' preferences to generate customized offers promote customer loyalty and create an almost insurmountable competitive advantage However, when customers do not have well-defined preferences or good insight into those preferences, the significance of the advantage produced by learning relationships with customers may come into question Furthermore, customers whose preferences are somewhat fuzzy and unstable may be less willing to commit to continuing to purchase from a one-to-one marketer if the perceived costs of such a commitment outweigh its perceived benefits The following discussion addresses factors that are expected to influence the tendency of customers with well-developed, stable preferences and those without such preferences to continue purchasing from one-to-one marketers that have customized their offers (see Figure 5)

Commitment of Customers with Well-Defined Preferences to One-to-One Marketers

Most of the examples used by proponents of one-to-one marketing and mass customization to illustrate the value of one-to-one relationships (e g , Pine, Peppers, and Rogers 1995) refer to situations in which the customer presumably wants the same product or variations of a product repeatedly, such as the same coffee, the same eyeglasses style, and the same shoe or greeting card design However, in most cases, customers are unlikely to purchase the same item habitually, without considering any other options Indeed, for such habitual decisions to occur, the following conditions must hold (1) The product category is not characterized by significant variety seeking or satiation, (2) the product category is characterized by little change in preferences over time, (3) the set of options available in the product category does not change significantly over time, and (4) customers do not feel the need to reevaluate options before each decision Because one or more of the conditions for habitual purchases usually do not hold, most customers are unlikely to repeat purchase decisions automatically without considering alternatives

In terms of the customer's costs and benefits of maintaining one-to-one learning relationships, customers with well-defined, stable preferences are likely to prefer marketers that remember their preferences, particularly when the convenience of not needing to respecify wants, switching costs, or inertia play a key role Furthermore, the marketer's effort to remember and act on the customer's prior preferences can create a favorable attitude and enhance customer loyalty to that marketer However, customers who have well-established and well-defined preferences and know those preferences are likely to be less dependent on any particular marketer and therefore less willing to accept suboptimal offers Specifically, the added convenience of not needing to respecify (well-defined) preferences on each purchase occasion often may not be a significant decision factor More important, when customers know their preferences, they can usually transfer this knowledge easily to

FIGURE 5
Maintaining Relationships with Customizing Marketers


Preference development and insight and ability to transfer preference knowledge (P_{12})
Level of reactance and discomfort/comfort associated with customized offers (involving human versus machine interaction) (P_{13}, P_{14})
Perceived costs and benefits of maintaining relationship with customizing marketers
Response to customized offers in subsequent periods

Notes: The proposition related to each component appears in parentheses.

other suppliers if they have a reason to do so. These arguments suggest that customers with stable, well-defined preferences may be more price sensitive and less loyal to any particular marketer, including one-to-one marketers that have invested in learning and storing their preferences.

> P_{12}: When faced with competing customized offers, customers with more stable, well-defined preferences are less loyal and more price sensitive than are customers with weaker preferences.

Commitment of Customers with Less Well-Defined Preferences to One-to-One Marketers

As explained previously, in most purchase decisions, customers' preferences are not fixed and predetermined, and customers are likely at least to consider the possibility of selecting other options. In such cases, customers may not respond favorably to marketers' presumptions that they know what the customers want even without asking. Consistent with the notion of reactance (e.g., Brehm 1966), customers may believe that their freedom of choice is restricted as marketers try to invade the domain of their personal preferences by suggesting to them what they want. Customers may also perceive marketers' claims of customization to their tastes as attempts to persuade and manipulate (e.g., Friestad and Wright 1994). Moreover, customers may object to marketing practices that involve keeping track and storing their preferences and then using that information to tell them what they are expected to choose.

Therefore, despite the benefits of individual marketing to customers, entering into customized relationships with marketers may represent a commitment that many customers do not wish to make. Consider the business concept of the Custom Foot chain of footwear stores. As Peppers and Rogers describe (1997, pp. 153–59), the customer first spends seven to ten minutes with each foot placed on a scanner device that makes a perfect measurement of the foot's contours. Next, the salesperson manually takes additional measurements.[1] The customer then sits at a computer console, answering specific questions about the type of wear that he or she has experienced on the current shoes, other questions about his or her prior shoe experiences, and various marketing questions. Custom Foot then uses this information to manufacture shoes that are customized to the customer's profile. However, even if the customized shoes fit fine, the customer may be reluctant to return to the store for the next pair because of the implied obligation to rely on the prior measurements and preference knowledge of the store. Indeed, customers are likely to feel uncomfortable going back to the same store and telling the salesperson that they have changed their minds and tastes and are now looking for a different type of shoe and a different design. Thus, entering into a "learning relationship" creates a commitment that many customers may not wish to make or maintain. This analysis is likely to apply in situations in which the purchase process involves human contact, such as the relationship between a customer and a salesperson. It is less likely to apply if the customized offers are designed and delivered by machines (e.g., a computer). Therefore, such concerns about the response to customized offers are not expected to apply to smart agents.

> P_{13}: A learning relationship used to customize offers may be perceived by customers as an indicator of good service but also as a restriction to their freedom of choice and can be a source of discomfort. The stronger the weight of the latter compared with the former factor, the lower is the

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[1] As an aside, Peppers and Rogers (1997) quote the company's chief executive officer, who indicated that the manual measurements are never used, but they increase the customers' confidence in the product's fit.

likelihood that a customer will sustain a one-to-one relationship with the marketer.

P_{14} The level of discomfort associated with a one-to-one learning relationship will be greater if the customization procedure involves human rather than machine (e.g., computer) contact.

General Discussion

Giving customers what they want (at a profit) is perhaps the most basic principle of marketing. Accordingly, the idea that marketers can obtain an insurmountable competitive advantage by learning and satisfying the wants of one customer at a time, as opposed to focusing on market segments, seems compelling. Similar approaches have been employed by marketers in many business-to-business markets, by catalogs, by the local barber and butcher, and by other sellers, which have used customer familiarity and personal service as key selling propositions. However, the new approaches to marketing suggest that learning individual customer preferences and satisfying those segments of one, including anticipating future wants, can now be applied using mass customization. It has thus been assumed in recent years that the age-old practice of targeting market segments is dominated and will be displaced by individual marketing (e.g., Kotler 2000). That is, in the future, customers in most markets may expect and will receive offers customized to their individual preferences. The present research examines the conditions that moderate customers' responses to customized offers and the effectiveness of individual marketing methods.

The process model presented in Figure 1, combined with the component models in Figures 2, 3, 4, and 5, capture key antecedents and phases of customers' responses to customized offers in the short and long run. An essential implication of the proposed framework and research propositions is that the benefits and costs of addressing individual customer preferences are much more complex and less deterministic than has typically been assumed. Furthermore, even when customers have well-defined preferences and receive offers that fit those preferences, it is far from certain that the response to such offers will be consistently and materially more favorable than the response to offers that are based on an analysis of the preferences and characteristics of market segments. Indeed, a great deal of research over the past two decades has shown that customer preferences are often ill defined and susceptible to various influences, and in many cases, customers have poor insight into their preferences (e.g., Bettman, Luce, and Payne 1998; Simonson 1993). The "noise" level created by these characteristics of customer preferences suggests that the true fit between the preferences and the offer is just one determinant of customers' responses to marketing offers. Thus, the response to customized offers depends more on cues regarding the offer's fit and value, customers' receptivity to certain types of offers, and customers' perceptions of one-to-one relationships than on marketers' ability to provide the perfect match to the customers' preferences. This analysis raises important questions that deserve further research, as discussed next.

Directions for Further Research on Individual Marketing

New managerial concepts and techniques that promise dramatic performance improvements have been introduced over the years. Although many of them were supported mainly by examples or anecdotes and were not subjected to rigorous testing, they enjoyed great popularity, usually for a short period. Given the short life cycle of such managerial innovations relative to the time required to publish an article in a major journal, researchers have been less inclined to study such techniques despite their initial popularity. Although this limitation may also apply to specific approaches such as one-to-one marketing and personalization, individual marketing and customer response to customized offers are fundamental to the marketing concept and deserve to be rigorously studied.

The present research identifies several areas for future study and outlines specific propositions. In addition to basic questions about the construction of preferences, further research should investigate the cues that customers use for determining whether the marketer made a genuine attempt to customize the offer or recommendation to their individual preferences and whether the offer fits their preferences. As discussed previously, such an investigation must consider the impact of relevant moderating variables, such as the degree to which customers have stable preferences and good insight into those preferences, the type of purchase at issue, the customer's active participation in the customization process, offer presentation format, and key fit indicators.

Beyond the evaluation of customized offers, further research might examine the factors that influence customers' acceptance of or tendency to act on customized recommendations. As suggested previously, if the perceived fit and attractiveness of an offer are held constant, prior research suggests that certain recommendations (e.g., to purchase a high-price, high-quality alternative or a luxury) are likely to affect actual purchase decisions.

In addition to studying the response to individual customized offers, it is important to examine the impact of practicing customization on the customer's commitment to and long-term relationships with marketers. As argued previously, customers with well-defined preferences and good insight into those preferences, in theory the bread and butter of one-to-one marketing, may be less committed and less loyal to customized relationships and one-to-one marketers. Furthermore, although one-to-one relationships can certainly offer significant benefits to customers, they may also be regarded as a source of discomfort and as restricting the customer's freedom of choice. Again, investigation of these issues must consider the moderating variables (e.g., the degree of variety seeking, the type of purchase and buyer–seller interaction) instead of just searching for main effects.

Managerial Lessons

The present framework and research propositions suggest four key lessons for managers. The first lesson is that the promise of individual marketing–based approaches and their advantage over segmentation have been greatly exaggerated, and in many cases, implementation of such approaches will not produce the expected benefits Therefore, considering that adoption of individual marketing often involves large investments and profound organizational and marketing strategy changes, managers should carefully evaluate the costs and likely benefits of such a strategy in their particular conditions Consistent with segmentation based on usage, offering customers what they have consistently purchased in the past (e g , offering red wine options to consumers who regularly buy red rather than white wines) will be more effective than offering the same options to all consumers Furthermore, because preferences for generic product types (e g , frozen orange juice, liquid detergent) tend to be more stable and predictable than preferences for specific options within a category, tracking usage at the individual customer level can improve the effectiveness of promotional tactics For example, mailing coupons or advertisements for a new frozen orange juice to prior frozen orange juice buyers is likely to produce a higher redemption rate (as practiced, for example, by Catalina Marketing, see www catmktg com)

However, because consumer preferences are often unstable and susceptible to influence and consumers often have poor insight into their own preferences, the value-added and impact of individually customized offers, as opposed to simple usage/benefit–based segmentation, will often be rather limited Therefore, contrary to the claims of the proponents of individual marketing, attempts to customize to individual tastes are unlikely to guarantee customer loyalty or prevent customers from being just as responsive to similar offers, coupons, and advertisements of competing brands

One qualification to this lesson involves situations in which customers habitually purchase the same item without considering other options Although such habitual purchases are unlikely to represent most purchase decisions, habitual purchases are likely to be associated with clear and known preferences (to both the marketer and the customers), which make it possible to provide these customers with exactly what they want, when and where they want it However, even under this scenario, customers may not attach much value to the marketer's knowledge of what they like and may not hesitate to switch to another supplier that offers superior value (e g , a better price), even if such an action requires transferring the knowledge of their preferences to the new supplier Thus, although good customer service can be an important purchase factor in many cases, even when individual marketing is effectively applied, it is doubtful that it will be sufficient to create an insurmountable competitive advantage (Peppers and Rogers 1997)

The second lesson from the present research is that managers should not consider individual marketing a technique to match individual customers' preferences Instead, individual marketing means that a marketer provides the customer with cues that the provided offers fit the customer's preferences Whereas attempts to learn the customer's true preferences and use that information to formulate the offer might affect the response to these offers, other cues can often have a greater impact on the customer's perceptions Such cues include, for example, framing the offer as individually tailored, encouraging customer participation in the offer's design, and paying special attention to the customer's signature preferences Furthermore, because customers often do not have well-defined preferences, presenting a customized offer in a context that makes it appear attractive compared with other presented options (e g , it is clearly superior to another presented option) is likely to enhance its perceived fit

The third lesson to managers is that in addition to conveying to customers that individual offers designed for them fit their preferences, it is important to consider the likelihood that the recommended offer will be accepted by the customer That is, if the perceived preference fit of an offer is held constant, customers are likely to be more receptive to some types of offers than to others For example, as explained previously, customers are more likely to change a default choice and accept a customized offer if the recommended option is associated with a relatively high price and high quality, a more risky option, or a hedonic luxury option

The fourth lesson is related to the nature of the one-to-one relationship between the marketer and the customer Given that the actual value of individual marketing to the customer is constrained when preferences are unstable and poorly defined, a marketer should not overestimate the willingness of the customer to make a long-term commitment to the relationship Furthermore, despite their investment in developing learning relationships with customers, marketers must make it clear that customers are free to change their preferences at any time, and the marketer's knowledge of what the customers want, or wanted at some point, in no way restricts their freedom of choice and the freedom to consider new options

Furthermore, individual marketers should be sensitive to the risk of irritating customers and damaging the relationship between the company and the customers by making incorrect assumptions about customers' preferences For example, *The Wall Street Journal* (Zaslow 2002) reports on a variety of (sometimes entertaining) false assumptions made by TiVo and Amazon about their users As reported in that article, when Mr Bezos, Amazon's chief executive officer, performed a live demonstration in front of a large audience of Amazon com's ability to cater to its customers' interests, the top recommendation the system gave him was the DVD for *Slave Girls from Beyond Infinity* A spokesman for Amazon later explained that this recommendation appeared because Mr Bezos had previously ordered the movie *Barbarella*

Although preference-matching technologies can be improved, the underlying limitations and instability of customers' preferences are unlikely to change Therefore, it is unwise to adopt indiscriminately the simplified assumption that individual marketing dominates segment-based marketing and will become the standard practice in the future Instead, marketing researchers should study the implications of the characteristics of customers' preferences and the determinants of customers' responses to marketing offers with respect to the conditions that moderate the effectiveness of one-to-one marketing and ways to enhance the effectiveness of individual marketing

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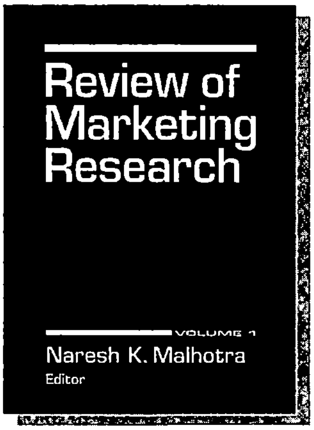

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Edward J. Fox & Stephen J. Hoch

Cherry-Picking

The authors analyze cherry-picking in the context of grocery shopping, comparing the behavior of consumers who visit two grocery stores on the same day (8% of shopping trips) with single-store shoppers. The authors find cherry-picking to be consistent with rational economic behavior. Cherry pickers benefit by saving 5% more per item while buying systematically (67%) larger market baskets.

The *Merriam-Webster Dictionary* defines cherry-picking as "selecting the best or most desirable" or, describing one idiom with another, "taking the pick of the litter." The term is used to describe both buyer and seller behavior. Sometimes the phrase describes sellers that are selective about which customers they serve. For example, Southwest cherry-picks price-sensitive travelers who place little premium on amenities, and Dell cherry-picks customers who are savvy enough to buy computers on the Internet and to make the necessary customization choices without much hand-holding. Both firms choose not to serve customers with a higher willingness to pay because it would require significant changes to efficient operating models. *The Cambridge International Dictionary of Idioms* defines cherry-picking as choosing "only the best people or things in a way that is not fair," as do financial institutions that refuse to serve high-risk populations. The term also describes the behavior of buyers who are selective about which products or services they purchase at what locations and prices. In both seller and buyer contexts, cherry pickers opportunistically take the best and leave the rest.

This article focuses on buyer-side cherry-picking. In a retail context, cherry-picking can occur within a single-store visit, as when consumers literally stand at an end-cap display of Mt. Rainier cherries and pick through every one, choosing only the largest and plumpest. Cherry-picking can also occur across stores. Levy and Weitz (2004) define cherry pickers as customers who visit a store and buy only merchandise sold at deep discounts. *Consumer Reports* (1988, p. 158) advises consumers to "scrutinize the food-day ads and 'cherry-pick' the specials."

Imagine a market with two grocery chains, Jewel and Dominick's Finer Foods, for example. The preceding comments imply that consumers can cherry-pick in at least two related ways. First, each week they can buy their entire market basket at the retailer that they believe offers the best deals. To the extent that competing retailers promote nonidentical items, consumers who switch stores across weeks are afforded more cherry-picking opportunities than are consumers who are store loyal. Moreover, the transaction costs associated with switching stores across weeks do not seem to be much greater than those incurred by store-loyal shoppers, under the assumption that travel costs to the stores from which they choose are similar and that consumers switch often enough to be adequately familiar with store layouts.

Second, shoppers can engage in a more extreme form of cherry-picking in which store switching occurs within weeks. In this case, customers split their market basket across stores within a week (potentially on the same day) to benefit from deals offered by different stores. Grocery retailers typically offer new specials every week, including uncoordinated promotions on the same brands (Drèze 1999; Lal 1990), so this second form of shopping behavior offers many more cherry-picking opportunities. The nature of these opportunities is illustrated in Figure 1, a histogram of the differences in weekly prices at Jewel and Dominick's for approximately 21,000 stockkeeping units over a period of 104 weeks. It shows the savings available from buying each item at the lower-priced versus the higher-priced retailer, savings that are more accessible to consumers who switch stores within weeks. The average difference in prices is approximately 10%, even though the two chains match prices on nearly one-third of the items and average prices are almost identical. Moreover, there is substantial surplus available to cherry pickers who are selective about which cherries they pick. For example, the top decile of price differences averages 39%, the second 21%, and the third 15%. But unlike cherry-picking across weeks, within-week (or -day) cherry-picking is likely to increase transaction costs substantially because it requires two store visits.

We view cherry-picking as one end of the price sensitivity and deal proneness continuum. In terms of models of horizontal competition in the Hotelling tradition, cherry pickers have low travel and search costs (Narasimhan 1988; Raju, Srinivasan, and Lal 1988) and are therefore willing to search for information on deals and visit more than one store to benefit from them (Lal and Rao 1997). The goal of this article is to gain an in-depth understanding of the shopping behavior of consumers who cherry-pick by visiting two or more grocery stores on the same day. Using two years of household panel purchase data, we identify the individual characteristics (traits), both demographic and geographic, that are most closely associated with frequent across-store, within-day cherry-picking. We compare how people shop when they cherry-pick two stores versus when they engage in more common single-store visits, and then we examine how experienced cherry pickers exploit a

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Edward J. Fox is W.R. and Judy Howell Director of the JCPenney Center for Retail Excellence and Assistant Professor of Marketing, Edwin L. Cox School of Business, Southern Methodist University (e-mail: efox@mail.cox.smu.edu). Stephen J. Hoch is John J. Pomerantz Professor and Chair of the Marketing Department, Wharton School, University of Pennsylvania (e-mail: hochs@wharton.upenn.edu).

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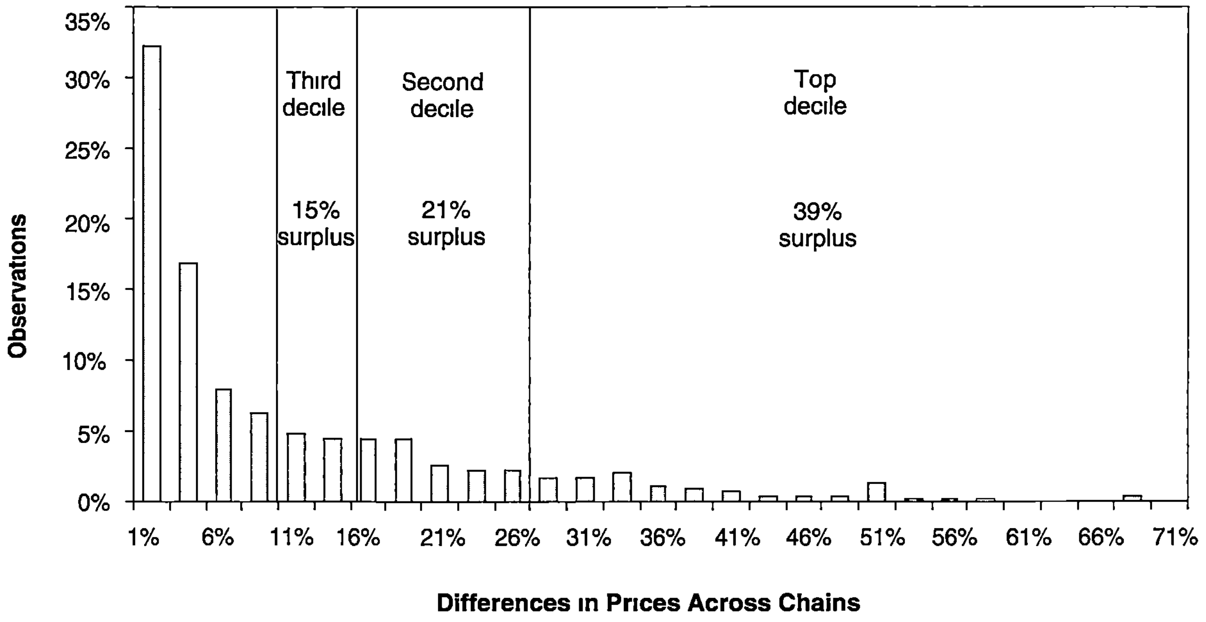
FIGURE 1
Histogram of the Difference in Prices Across Grocery Chains



cherry-picking occasion compared with those who are less experienced

We also focus on the question Is cherry-picking worth it? The answer boils down to a cost/benefit trade-off between the extra money saved and the extra shopping costs incurred when customers visit an additional store We calculate the money saved as a result of cherry-picking and compare it with a reasonable estimate of shoppers' opportunity cost of time We find that the savings on cherry-picking days average over $14 more than the savings on single-store days This economic benefit exceeds the opportunity costs of the extra store visit for most households Cherry-picking savings arise from two sources (1) higher percentage savings on items purchased (approximately 5% higher) and, equally important, (2) much larger market baskets (approximately 67% larger in both dollars and units) Both of these effects are consistent with economic theories of search

This article contributes to the marketing literature in several ways Despite its ubiquity as a surrogate for price sensitivity in economic models of retail competition, cherry-picking has seldom been a subject of empirical research Analysis of this behavior broadens our understanding of consumer response to price and promotion We examine long-term shopping decisions and patterns (e g , propensity to cherry-pick) and derive insights into shopping strategies that would be less discernible if we had focused on single-purchase occasions Moreover, the multioutlet panel data we use facilitate the analysis of shopping across stores in a depth not previously possible Our analysis shows why and when shoppers cherry-pick and identifies the traits of frequent cherry pickers We find that cherry-picking is consistent with economic rationality, specifically with models of price search across stores We also document systematic differences in shopping behavior that are associated with cherry-picking and that bring predictable consequences for retailer sales and profits Finally, we show which retailers are most severely affected by cherry-picking behavior

The remainder of the article is organized as follows In the next section, we briefly review the relevant literature and develop propositions about cherry-picking Next, we describe the data to be analyzed The analysis proceeds as follows We examine how demographic and geographic characteristics are related to cherry-picking, then we determine how time-varying factors influence the probability of cherry-picking, next, we measure the savings that shoppers generate by cherry-picking, and finally we investigate buying behavior in shoppers' primary (most frequently visited) and secondary (less frequently visited) stores In the concluding section, we discuss the results of our study and further research

Economics of Price Search

There is an extensive literature in economics and marketing on price search that is relevant to cherry-picking This literature focuses on two distinctly different problems (1) sequential search across stores for a single costly durable good (e g , Lippman and McCardle 1991) and (2) price search across grocery stores for information about frequently purchased goods (e g , Stigler 1961) Studies of the first type find that the extent of search is negatively related to the opportunity cost of time, usually operationalized as wage rate or household income (Marmorstein, Grewal, and Fishe 1992, Ratchford and Srinivasan 1993), but positively related to self-reported benefits from search such as enjoyment of shopping (Doti and Sharir 1980, Marmorstein, Grewal, and Fishe 1992) or social returns to market knowledge (Feick and Price 1987) Note that these findings pertain to individual characteristics, or traits, that are predictive of search behavior Studies of the second type relate similar individual traits to price search among grocery stores Petrevu and Ratchford (1997) and Urbany, Dickson, and Kalapurakal (1996) find that economic benefits from searching, which are dependent on price dispersion and per capita income, are positively related to search They also find that the costs of search, including opportunity cost of time and perceived costs such as time pressure, difficulty in comparing stores, and lack of physical energy, are negatively related to search

Burdett and Malueg (1981) and Carlson and McAfee (1984) model a consumer visiting one or more grocery stores to minimize the cost of shopping for a predetermined list of items Burdett and Malueg (1981, p 362) detail their assumptions

> Before starting out to buy groceries for the week, suppose an individual makes a list of the *n* goods required (n ≥ 2) The list also states the amount required of each good There are many grocery stores the individual can visit Each of these stores sells all the goods desired The individual can visit any store at a cost and observe the *n* vector of prices offered, one price for each of the *n* goods The individual can purchase any number of the goods required from this store and then continue to search for the remaining goods

In other words, the consumer may buy all required items at the first store visited or buy a subset of the required items there and visit additional stores to buy the remaining items Burdett and Malueg (1981) develop a mathematical model of this decision for n = 2 products, Carlson and McAfee (1984) extend it for any positive integer n Together, these models represent a theory of multistore shopping for a predetermined list of goods Because shopping lists and retailer prices vary between trips, we expect trip-specific variables that we term "state" (as opposed to trait) to affect multistore shopping

Carlson and Gieseke (1983) test some predictions of this theory They find that prices paid are negatively related to the extent of search, which they operationalize as the number of grocery store visits a shopper made during a given period (1 week for perishable goods, 13 weeks for storable goods) Carlson and Gieseke also find that the number of store visits is positively related to quantities purchased and to the shopper's age

We apply Burdett and Malueg's (1981) and Carlson and McAfee's (1984) multistore shopping theory to cherry-picking Three propositions about cherry-picking behavior are implied by the theory

P_1 There is a negative relationship between the probability of cherry-picking on a given shopping trip and the consumer's cost of visiting an additional store

P_2 There is a positive relationship between the probability of cherry-picking on a given shopping trip and the size of the consumer's shopping list

P_3 Prices paid while cherry-picking are less than the prices paid on single-store visits

P_1 pertains to the costs of search, whereas the other two propositions involve the benefits of search We examine what this cost/benefit trade-off implies about who is likely to cherry-pick, when they are likely to cherry-pick, how cherry-picking affects shopping behavior, and what benefits accrue from cherry-picking

P_1 considers the cost of an incremental store visit, including extra planning and travel and time spent shopping and checking out It is well established that the cost of a shopping trip increases with the consumer's opportunity cost of time This leads us to hypothesize that there is a negative relationship between the probability of cherry-picking on a given shopping trip and the consumer's opportunity cost of time Because opportunity cost is not directly observable, our empirical analysis of this hypothesis will include the following proxy measures (1) household earned income [–], (2) the presence of a working adult female in the household [+], (3) a senior citizen ≥65 years of age [–], (4) college education [+], and (5) weekend versus weekday shopping time [–] (The sign in brackets following the proxy measure of opportunity cost reflects the expected relationship, positive or negative, between the probability of cherry-picking and that specific measure) The first four measures are shopper traits that commonly serve as proxies for opportunity cost of time (e g , Becker 1965, Blattberg et al 1978, Hoch et al 1995), whereas the last is a state, or trip-specific, variable The cost of shopping also increases with the distance the shopper must travel to the store, reflecting the time and direct cost of transportation We cannot measure travel distance for specific shopping trips, however, because we do not know with certainty where each trip originated and what route the shopper took Therefore, we must treat travel distance as a household trait rather than a state variable If we make the simplifying assumptions that (1) all trips originate from home and (2) the shopper travels from the first store visited directly to subsequent stores without intermediate stops, then the distance between the closest and next-closest stores reflects the cost of an incremental store visit [1] Therefore, we hypothesize that there is a negative relationship between the probability of cherry-picking on a given shopping trip and the distance between the closest and next-closest stores to the consumer's home

Together, P_2 and P_3 relate the benefits from cherry-picking to the size of the consumer's shopping list and the price dispersion of individual items across stores Visiting two stores on the same day basically doubles the number of savings opportunities that shoppers can exploit if they so choose (see Figure 1) If a shopper plans to purchase a larger-than-average market basket, the benefits of search will be greater because the total savings from cherry-picking equals the number of items multiplied by the savings per item Basket size is increased by buying larger quantities, so we hypothesize that there is a positive relationship between the probability of cherry-picking on a given shopping trip and a household's purchase quantities Large families in particular tend to buy in larger quantities (Blattberg and Neslin 1990) and are more price sensitive (Hoch et al 1995) Note that Carlson and Gieseke (1983) find that the low prices shoppers obtain by searching across stores induce them to buy larger quantities, which suggests a healthy dose of endogeneity in the purchase quantity and cherry-picking decisions The size of the shopping list also depends on the cost of holding inventory, so we hypothesize that there is a negative relationship between the probability of cherry-picking on a given shopping trip and a household's inventory-holding cost. This suggests that household traits that reduce holding cost—for example, home ownership—have a positive impact on the likelihood of cherry-picking Inventory-holding cost is also positively related to current inventory We expect that current inventory (and therefore holding cost) is lower and the likelihood of cherry-picking is higher (1) when more time has elapsed since the last shopping trip and (2) when spending on the last trip was smaller We summarize the propositions and associated hypotheses in Table 1 Note that we offer no additional hypotheses for P_3—we test it directly subsequently

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[1] In our data set, on 99% of cherry-picking days only two stores are visited Therefore, the distance from the nearest store to the store closest to it provides a reasonable approximation of the cost of an incremental store visit

TABLE 1
Propositions and Associated Hypotheses

Proposition	Hypothesis
P_1	There is a negative relationship between the probability of cherry-picking on a given shopping trip and the consumer's cost of visiting an additional store •There is a negative relationship between the probability of cherry-picking on a given shopping trip and the consumer's opportunity cost of time, operationalized as (a) household earned income [–], (b) presence of a working adult female in the household [+], (c) a senior citizen ≥65 years of age [–], (d) college education [+], and (e) weekend versus weekday shopping time [–] [a] •There is a negative relationship between the probability of cherry-picking on a given shopping trip and the distance between the closest and next-closest stores to the consumer's home
P_2	There is a positive relationship between the probability of cherry-picking on a given shopping trip and the size of the consumer's shopping list •There is a positive relationship between the probability of cherry-picking on a given shopping trip and the household's purchase quantities, operationalized (a) directly and (b) indirectly as family size •There is a negative relationship between the probability of cherry-picking on a given shopping trip and the household's inventory-holding cost, operationalized as (a) the time elapsed since the last shopping trip [+], (b) the amount spent on the last trip [–], and (c) home ownership [+] [a]
P_3	Prices paid during cherry-picking are less than the prices paid on single-store visits

[a] The sign in brackets [+/–] reflects the expected sign of the relationship between the probability of cherry-picking and the specific measure of opportunity cost of time or inventory-holding cost

The Study

Data and Variable Construction

The data come from a multioutlet Information Resources Inc household panel in Chicago covering a two-year period (104 weeks) between October 1995 and October 1997 This data set is different from the majority of panel data sets used in academic research because panelists record their purchases using in-home scanning equipment, so their purchase histories are not limited to the usual small sample of stores All purchases, including the Universal Product Codes of packaged goods purchases, are captured on all trips to a wide variety of retailers Our analysis focuses on grocery retailers We find that the two largest grocery chains, Jewel and Dominick's, together account for 74% of panelists' purchases at known grocery stores, the eight largest grocery chains together account for 99% of purchases Each packaged goods purchase in the panel data set is accompanied by the purchase price and indicators of whether the item was sold on deal or feature advertised

The purchase data set is supplemented by a merchandise file containing all item prices at Jewel and Dominick's for the following ten packaged goods categories chocolate candy, carbonated beverages, coffee, diapers, dog food, household cleaners, laundry detergent, salty snacks, sanitary napkins, and shampoo The availability of item prices at the two largest retailers enables us to compare them directly and quantify the savings due to cherry-picking The data set also includes demographic information for each household, enabling us to test the relationships between household characteristics (traits) and cherry-picking The data set is further augmented by locations of panel households and grocery stores [2] These locations enable us to compute travel distances both from shoppers' homes to stores and between stores in order to assess the relationships between geographic variables and cherry-picking We limit our analysis to store visits on which the shopper makes a significant purchase, as opposed to, for example, buying only a bag of ice Accordingly, we analyze visits with purchases of at least $5 (including smaller trips has no material influence on the results)

We present a broad set of analyses For most of the analyses, we report shopping trips, purchases, spending, and so forth, across the eight largest grocery store chains in the market This makes our investigation as comprehensive as possible However, calculating the economic benefits of cherry-picking requires us to measure savings in a relative rather than an absolute context Because this market is essentially a duopoly, we have chosen to compute savings using a direct comparison of Jewel and Dominick's prices in the ten categories for which we have item-level price information We then extrapolate from these sample categories to the entire market basket to assess the magnitude of savings. Using this approach, our analysis of the economic benefits of cherry-picking includes a sample of 22,913 individual purchases made during 9562 shopping trips.

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[2] The household location provided is the centroid of the panelist's zip code + 4 To preserve panelists' privacy, we do not provide street addresses Travel distances are Euclidean distances between stores and households (or for one analysis, between stores and other stores)

Because preliminary analyses suggested that some of the panel households were not faithfully recording all of their shopping trips and purchases, we developed criteria to screen households that did not appear to be recording diligently. Panel households were included in our data set only if, over the 24-month duration of the panel, (1) they recorded grocery purchases in each month, (2) they averaged less than 14 days between shopping trips, and (3) they spent at least $25 per week at grocery stores. This resulted in a total of 201 households with complete data. Table 2 reports available demographic and geographic variables for these households, along with their monthly grocery spending and shopping trips. The households shopped on a total of 27,978 days (5.8 shopping days per household per month) over the two-year period. Note that the supercenter format had very low penetration in the market during the period in which data were gathered (October 1995–October 1997), so households eliminated by our screening process were unlikely to have been shopping at supercenters as an alternative to grocery stores. Aware that our screening criteria may have resulted in the omission of households that were accurately recording sparse grocery purchases or that less vigilant recorders may behave differently from those who are more diligent, we ran the same analyses after relaxing the screening criteria. The inferences were virtually the same as those reported here.

Cherry-Picking Propensity: Demographic and Geographic Variables

As mentioned previously, we view cherry-picking as a continuum much like a shopper's degree of price sensitivity or deal proneness. For the purpose at hand, a shopping trip is classified as cherry-picking if two or more grocery stores are visited on the same day, that is, without intervening consumption. We use the term "trip," though we do not actually observe whether the shopper goes from one store directly to the next or makes intervening stops, perhaps at home. Moreover, this operationalization misses some cherry-picking occasions, in which shoppers with foresight visit two or more stores on different days during the same week to acquire that week's provisions. At the same time, our operationalization avoids confusing a fill-in trip, when the consumer runs out of items or forgets to get everything on the list, with a preplanned and purposeful attempt to split the market basket in order to save money.

Figure 2 shows the distribution across households of cherry-picking trips as a percentage of all the household's shopping trips. Two important characteristics are evident. First, nearly one-fifth of the sample does not cherry-pick at all. Second, the distribution is heavily skewed with a long right tail. Therefore, most households are on the low end of the cherry-picking continuum. The mean and median of the percent cherry-picking distribution are 7.7% and 4.2%, respectively, whereas households in the top decile cherry-pick on 32.0% of shopping trips. Although they may not seem compellingly large, these statistics belie the fact that each cherry-picking trip is made up of multiple store visits. If we consider the distribution of store visits, which reflect retailer traffic counts, we find that the mean and median are 13.2% and 8.2% respectively, whereas the top decile cherry-picks on 49.3% of visits.

The dependent variable in our first analysis is the percentage of trips on which the household cherry-picked (visited ≥2 grocery stores) out of all shopping trip days. By aggregating cherry-picking behavior across time at the household level, we can focus on household-specific traits, both demographic and geographic, rather than time-varying states. As mentioned previously, nearly 20% of the households never cherry-picked. To accommodate this "spike at zero," we model cherry-picking across households using a censored regression methodology (Tobin 1958). We log-transform the dependent variable to approximate more closely the assumption of normally distributed residuals. Because the demographic and geographic predictors are in some cases interrelated, we specify the model using a forward stepwise procedure, sequentially adding whichever predictor maximizes the likelihood of the data, conditioned on the current set of predictors. The resultant specification therefore avoids multicollinearity, so the standard errors may be used for inference. The stepwise procedure stops when addition of another variable fails to improve the Akaike information criterion.

The resulting model is shown in Table 3. Along with the overall fit of the model, Table 3 shows the regression coefficient, associated standard error, and *p*-value for each independent variable. The last column in Table 3 displays the expected percentage of cherry-picking if that parameter took on the value of zero while all other parameters were at their estimated values, to give an indication of the substantive impact of each variable; the numbers can be compared with the expected value of percent cherry-picking when all parameters take on their estimated values, that is, $E(y)|\beta = \beta^* = 4.18\%$. The results are straightforward and are consistent with an opportunity cost perspective. Specifically,

- Households are less likely to cherry-pick when there is a working adult female in the family, presumably because it is more costly for them to spend time shopping for groceries. If none of the households in our sample contained working adult females, the expected cherry-picking probability would be approximately 16% higher ([4.83% – 4.18%]/4.18%).
- Senior citizens (≥65 years of age) are less likely to be employed outside the home and thus have more time to invest in shopping. The presence of a senior citizen in the household increases percent cherry-picking by approximately 15%.
- Home ownership implies greater inventory-holding capability. This further implies that home-owning households can take advantage of the greater number of discounts available through cherry-picking because they have more opportunity to accelerate purchases by forward buying. Home ownership increases the propensity to cherry-pick by approximately 43%.
- Wealthy households are assumed to have higher opportunity costs and be less price sensitive. Indeed, household income has a negative impact on percent cherry-picking.
- Larger households are assumed to be more price sensitive because they need to spend a greater proportion of their

TABLE 2
Descriptive Statistics and Intercorrelations of Household Characteristics and Behaviors

Measure	Mean	S.D	1	2	3	4	5	6	7	8	9	10	11
Demographics													
1 Working adult female[a]	39	49											
2 Senior citizen (≥65 years)[a]	18	38	–24**										
3 Home owner[a]	88	33	08	–03									
4 Family size[a]	2 07	1 48	–12	–29**	15*								
5 Household income (× $1000)	54 6	26 6	16*	–19**	21**	16*							
6 College educated[a]	25	43	10	–03	00	04	24**						
7 Married[a]	75	44	–16*	–09	28**	53**	22**	07					
8 Young children (≤6 years)[a]	18	38	–11	–22**	05	46**	06	09	24**				
Geographic Variables													
9 Distance between nearest store and home (miles)	1 17	1 11	–04	–10	06	10	11	10	15*	15*			
10 Distance between nearest and next-nearest stores (miles)	1 34	1 10	09	–02	05	12	–02	13	19**	06	32**		
Shopping Behaviors													
11 Grocery spending per month (in dollars)	518	220	–11	–17*	14	46**	16*	–04	36**	21**	13	01	
12 Grocery trips per month	5 84	2 63	–10	02	–02	17*	–04	–03	23**	07	–07	–08	56**

*α = 05
**α = 01
[a] Percentage of shoppers reporting the demographic characteristic
Notes S D = standard deviation

FIGURE 2
Distribution of Household Percent Cherry-Picking Trips

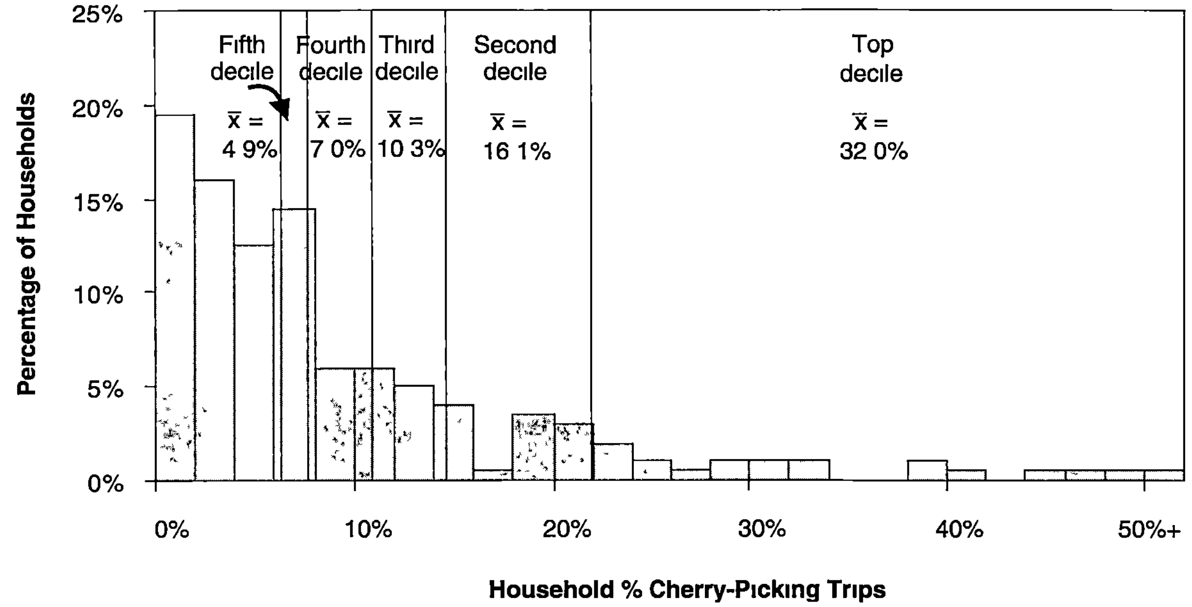


TABLE 3
Stepwise Censored Regression for Household Percentage of Cherry-Picking Trips

Observations	201
Percent cherry-picking > 0	162
Percent cherry-picking = 0	39
Log-likelihood	–340.2943
U^2	.0435
$E(y)\|\beta = \beta^*$	4.18%

Parameter	β^*	Standard Error	*p*-Value	$E(y)\|\beta = 0$
Intercept	–4.112	.394	< .0001	
Working adult female	–.599	.248	.0159	4.83%
Senior citizen (≥65 years)	.739	.318	.0200	3.55%
Home owner	.738	.359	.0399	2.37%
Distance between nearest and next-nearest stores (miles)	–.226	.106	.0334	5.36%
Family size	.154	.083	.0613	3.20%
Household income (× $1000)	–.010	.005	.0295	6.56%
College educated	.406	.268	.1304	3.85%

income on groceries (budget constraint) and they have greater returns to price search by virtue of purchasing scale. Each additional person in the household increases the propensity to cherry-pick by approximately 4%.

- Travel distances and times also exert an influence on cherry-picking propensity. Although we find no effect for how close the nearest store is to the home, there is a negative effect for the distance from the nearest to the next-nearest store. We take this as evidence that the household considers the incremental cost of the extra store visit (which can be very low if nearby stores are close together or more costly if not) against the expected benefit of the additional discounts available if that extra store visit is made. Each extra mile between stores decreases the percentage of cherry-picking by approximately 5%.
- Finally, note that though college education (another surrogate for opportunity costs) entered the final model through the stepwise procedure, the positive parameter estimate is not significant.

Given the large number of household-specific factors that significantly affect the propensity to cherry-pick, we now consider whether cherry pickers are heterogeneous. To investigate heterogeneity we perform a k-means cluster analysis on the 50 households that compose the top quartile of cherry pickers using the demographic and geographic factors selected by the stepwise procedure as predictors. The two-cluster solution explains more than 43% of the variance in these predictors and offers a clear interpretation

Solutions with higher numbers of clusters offered relatively small increases in R^2, generated small cluster sizes, and were difficult to interpret The larger cluster (60% of top quartile households) is composed of 43% senior citizens with an average of 2 16 members per household, none of these households have five or more members The smaller cluster (40% of the top quartile) has only 10% senior citizens but averages 4 75 members per household, almost half of which have five or more members Therefore, there appear to be two distinct types of cherry-picking households ones with older heads of household and ones with many members

Probability of Cherry-Picking: Trip-Specific Variables

Multistore shopping theory focuses on the household's list for a particular shopping trip Because the shopping list differs from trip to trip, our empirical analysis must include trip-specific factors Having already considered consumer traits as antecedents of cherry-picking, we now turn our attention to state, or trip-specific, factors

Consider the day of the week when consumers shop The standard workweek is Monday through Friday, on weekends consumers bear the opportunity cost of time for nonworking days We find that both single-store and cherry-picking trips are made at a higher rate on weekends, particularly if we include Friday The most popular shopping day is Sunday, followed by Friday and Saturday, 58% of cherry-picking trips and 46% of single-store trips are made on those three days This suggests that opportunity costs on weekends are lower than those on weekdays

Consumption, by its definition, implies a negative change in inventory over time Because higher inventory levels mean lower purchase requirements, we expect the number of items on the consumer's shopping list to increase with the time since the last shopping trip, the last opportunity to replenish household inventory On that last trip, the shopper's inventory was incremented by the amount purchased By the same reasoning, then, we expect the number of items on the shopping list to decrease with the amount purchased on the last shopping trip Therefore, the probability of cherry-picking should increase with the time since the most recent trip but decrease with the amount purchased on that trip

Table 4 shows the results of a mixed-effects logistic regression of shopping trips, with cherry-picking (1 = yes, 0 = no) as the dependent variable We model only households that make at least one cherry-picking trip, resulting in a total of 23,796 trips, 2416 (10 15%) of which involved cherry-picking To control for consumer traits, we model the intercept parameter as a random effect that varies across households according to a normal distribution We model other predictors as fixed effects These predictors are (1) an indicator variable for whether the trip was made on a weekend (1 = yes, 0 = no), (2) the number of days since the last shopping trip, (3) dollar spending on the last shopping trip, and (4) the interaction between the previous two We subtract one from the number of days since the last trip so that the main effect of spending on the last trip can be interpreted as applying to the day after that trip If we do not "relocate" this variable by one day, the main effect of spending on the last trip would apply to the day of that trip (i e , zero days since the last trip), which makes interpretation difficult Spending on the last trip is median centered The main effect of time since the last trip therefore assumes the median value of spending on that trip We use the median rather than the mean for centering because the distribution of spending on the last trip is highly skewed

Estimated coefficients for all predictors are statistically different from zero and consistent with a priori reasoning

- The longer the time since the last shopping occasion, the more likely it is that people engage in a cherry-picking trip Presumably this is because inventory is lower, so the household has greater inventory-holding capacity and can better exploit the extra deals afforded by shopping two stores rather than just one Increasing the time since the last trip by one day increases the probability of cherry-picking by an average of nearly 2%
- Analogously, the amount spent on the last trip is a significant negative predictor This effect is also consistent with the inventory-holding story just presented Increasing the amount spent on the last trip by $10 decreases the probability of cherry-picking by an average of 3%

TABLE 4
Mixed-Effects Logistic Regression for Cherry-Picking Trips

Observations	23,796
Cherry-picking = 1	2416
Cherry-picking = 0	21,380
Log-likelihood	–6747 96
U^2	591
E(y)|β = β*	10 15%

Parameter	β*	Standard Error	*p*-Value	E(y)|β = 0
Intercept[a]	–2 91	10	< 00001	
Weekend	259	028	< 00001	9 35%
Spending on last trip	– 00335	00047	< 00001	10 57%
Time since last trip	0206	0048	00002	9 48%
Spending on last trip × time since last trip	00023	00009	00726	10 01%

[a] Standard deviation of the estimated intercept across households is 1 124 with a standard error of 056 and associated *p*-value of < 00001

- The interaction between time since the last shopping trip and amount spent is positive and significant, which suggests that the negative effect of the last trip's spending on the probability of cherry-picking dissipates as the time since that trip increases
- The indicator variable for weekend is a positive predictor of cherry-picking trips The effect size is substantial—the expected probability of cherry-picking would be reduced by 7 9% ([9 35% – 10 15%]/10 15%) if no trips were made on weekends Marmorstein, Grewal, and Fishe (1992) counterintuitively argue that the marginal cost of nonworking time should reflect a higher overtime wage rate, but our result suggests that paid overtime is not often an alternative to time spent shopping or at leisure on the weekend To the contrary, it suggests that the opportunity cost of time during the weekend is lower than during the workweek

Behavioral Consequences of Cherry-Picking

We have shown that household traits, including consumer and household characteristics and distances between stores, affect the probability that a household will cherry-pick We have also shown that trip-specific state variables, including previous shopping decisions and day of the week, affect the probability of cherry-picking Next, we examine how shopping behaviors differ between cherry-picking and single-store trips We model these shopping behaviors as a function of the household's propensity to cherry-pick (trait), whether the trip is single store or cherry-picking (state), and the interaction of trait and state Our intent with these models is to investigate whether the economic returns to cherry-picking are influenced by consumers' experience using this shopping strategy

Table 5 summarizes differences in a variety of measures of shopping behaviors (left-hand panel) on cherry-picking versus single-store trips The center panel compares cherry-picking shopping trip days with single-store shopping trip days across all panel members The right-hand panel of Table 5 reports the parameters and their associated standard errors for multiple regressions of each dependent variable onto

1 *HH% CP* household percentage of cherry-picking trips, a measure of household-specific differences in cherry-picking propensity,
2 *CP Trip* a cherry-picking indicator for the trip of interest (1 = yes, 0 = no) that captures trip-specific differences, and
3 *HH% CP × CP Trip* the interaction of the two

Applying appropriate techniques for moderated regression (Irwin and McClelland 2001), we center HH% CP on its median value The main effect of CP Trip therefore assumes the median-level HH% CP (5%) We code CP Trip (1 = yes, 0 = no) so that the main effect of HH% CP is based on the more common non-cherry-picking (i e , single-store) trip Depending on the distribution of the dependent variable, we estimate an ordinary least squares (OLS), weighted least squares (WLS), logistic, or censored regression

For eight of nine of the dependent variables in Table 5, there are obvious and statistically significant differences between cherry-picking and single-store trips (the state variable), the exception being quantity purchased We discuss each modeled shopping behavior in turn and consider how HH% CP, the household trait reflecting cherry-picking experience, influences differences between single-store and multistore shopping occasions Unless noted, the main effects and interactions we discuss are statistically significant (see Table 5)

Trip size There are substantial differences in the amount of merchandise purchased depending on whether the household visits one or multiple stores on a particular shopping occasion Whether measured in total dollar expenditures or number of units, people buy over two-thirds more when cherry-picking As shown in Table 5, this cherry-picking effect is large and statistically reliable In addition, the negative main effect of cherry-picking propensity and the large positive interaction indicates that the trip size differences between cherry-picking and single-store occasions are substantially greater for households that are more practiced at cherry-picking To get a handle on the magnitude of this effect, we compare the top quartile of HH% CP households with the other three-quarters For the top quartile of cherry pickers, the difference between single-store and multistore visits is more than 105% ($119 versus $58) compared with less than 60% ($119 versus $75) for the remaining households This suggests that more experienced cherry pickers may plan on being opportunistic By buying less on single-store trips, they put themselves in a position to benefit more from cherry-picking trips, in which they can take greater advantage of the additional price deals afforded by shopping two stores These findings are related to the results in Table 4, where the size of the last trip and time since the last trip are shown to have negative and positive influences, respectively, on the likelihood of cherry-picking on the current trip

Items on deal or feature advertised The pattern of results for both the percentage of items bought at discounted prices and feature advertised is quite similar Because consumers have more potential deals to exploit at two stores than at just one, we find that people purchase 25% more items on deal They also buy over one-third more items that are feature advertised Although we have no direct evidence of this, it is possible that shoppers are more likely to read the best food day advertisements when they cherry-pick, or perhaps particularly attractive advertised specials provide some motivation to cherry-pick In addition to the significant main effects of CP Trip, the price deal and advertising variables also have positive main effects for HH% CP, coupled with negative interactions Irrespective of whether the shopping occasion is single-store or multistore, heavy cherry-picking households (i e , the top quartile) are more likely to buy items on deal (23%) or advertised (25%) than are other households (deals, 17%, advertised items, 23%) The negative interaction coefficients indicate that the differences in buying items on deal or advertised between cherry-picking and cherry-picking days are smaller for heavy cherry pickers (deals, 12%, advertised items, 21%) than they are for the other three-quarters of the sample (deals, 33%, advertised items, 50%) Overall, these results suggest that households take advantage of the increased number of price savings opportunities afforded by cherry-picking The results also suggest that heavy cherry pickers are more vigilant shoppers irrespective of type of shopping occasion, though there are diminishing returns to this vigilance

TABLE 5
Cherry-Picking Trait Versus State Analyses

	Marginal Means			Parameter Estimates					
Variable	Cherry-Picking Trip	Single-Store Trip	Percent Difference	Analysis[a]	N	R^{2}[b]	HH% CP	CP Trip	HH% CP × CP Trip
Trip size (in dollars)	$118 93	$70 71	68 2	OLS	27,978	076	–98 7** (3 9)	45 5** (1 7)	99 6** (8 0)
Trip size units	54 5	32 4	68 1	OLS	27,978	054	–49 8** (2 2)	20 2** (1 0)	53 2** (4 5)
Percentage of items bought at discounted prices	37 4%	29 9%	24 8	Tobit	25,879	015	275** (022)	108** (009)	– 365** (043)
Percentage of items bought that are advertised	24 4%	18 2%	34 3	Tobit	25,879	017	278** (023)	121** (009)	– 347** (045)
Price per unit (indexed measure)	952	1 006	–5 3	OLS	22,913	003	– 295** (043)	– 0348** (0157)	152* (079)
Quantity (indexed measure)	1 028	997	3 2	OLS	22,913	001	272** (062)	0220 (0399)	– 184 (114)
Probability of buying at the lower price	78 0%	72 4%	7 8	Logistic	22,913	003	1 09** (21)	125* (069)	– 055 (406)
Percent off higher price	14 9%	10 2%	45 9	WLS	300	160	168** (036)	0280** (0088)	– 0509 (0587)
Savings per trip	$23 56	$8 90	164 6	WLS	300	385	5 92 (5 75)	11 4** (1 4)	24 4** (9 3)

*α = 05

**α = 01

[a] For most continuous dependent variables, OLS is used For continuous dependent variables that are the means of unequal numbers of observations (e g , savings per trip for each household), WLS is used, the weight assigned to each observation is proportional to the square root of the number of observations that compose the dependent variable (e g , the square root of the number of savings observations for each household) Logistic regression is used when the dependent variable is binary Censored regression is used for continuous dependent variables that are bounded below at zero and where there are several zero observations (e g , the proportion of feature-advertised products purchased on a given trip)

[b] For tobit regressions, a pseudo R^2 that approximates the percentage of variance explained is reported, for logistic regressions, U^2 is reported (U^2 and R^2 are not directly comparable)

Quantities purchased Another way that households can take advantage of the additional price savings opportunities afforded by cherry-picking is to buy larger package sizes The quantity variable used in this analysis is volumetric units purchased (e g , ounces, liters, count, number of rolls) divided by average volumetric units purchased in that category, thus enabling comparison across categories Like an index, the quantity variable is centered at one As Table 5 shows, people buy 3% larger package sizes when cherry-picking, though this difference is not significant The only statistically significant effect is for the HH% CP variable The top quartile of cherry pickers buy 5% larger package sizes than do the rest of the population This difference might be related to the lower inventory-holding costs of these heavy cherry pickers that we observed previously, which may make it easier for them to increase the overall size of cherry-picking trips through more opportunistic planning of big purchases

Prices paid To get a sense of differences in price sensitivity between shopping occasions, we construct a standardized measure of price per unit We divide the item price by the number of volumetric units (e g , liters, ounces, count, number of rolls) of the item and then standardize it by dividing by the average price per unit for the category This controls for noncomparability in package sizes and for the fact that most products are priced to provide a quantity discount for large package sizes We observe that people pay 5% less on cherry-picking occasions than on single-store trips, a difference that is economically significant We also find a significant, negative main effect of HH% CP along with a significant, positive interaction Overall, heavy cherry pickers pay more than 5% less per unit than does the rest of the sample The interaction reduces this difference on cherry-picking occasions (declining from 6% versus 4%)

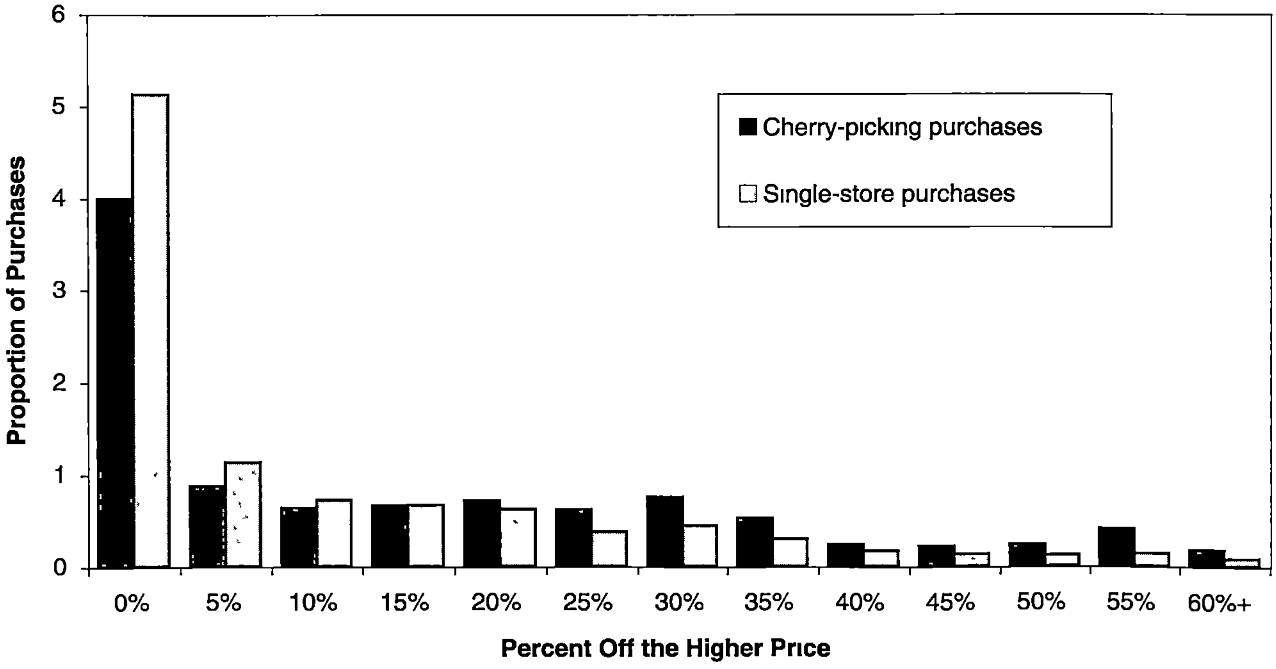
Economic Benefits from Cherry-Picking

The next set of analyses focuses on the economic benefits customers realize when shopping at a single store compared with cherry-picking multiple stores We have already shown that there are substantial differences in the size of cherry-picking ($119) and single-store ($71) shopping trips To estimate the total savings from cherry-picking two stores, we first determine how much money shoppers save compared with if they had purchased all items at the higher-priced store Although cherry-picking affords twice as many potential savings opportunities as shopping at a single store, important questions are whether and how well shoppers exploit those opportunities Recall that the Chicago grocery market is effectively a duopoly, in which the majority (65%) of cherry-picking at known stores is done at Jewel or Dominick's Finer Foods[3] Also recall that Figure 1 shows how most items can be purchased less expensively, sometimes far less, at one retailer or the other even though Jewel and Dominick's have many common prices To determine whether shoppers pay lower prices when cherry-picking, we focus exclusively on item purchases at Jewel and Dominick's in the ten categories for which we have Universal Product Code–level price information We include only items that are available concurrently at both Jewel and Dominick's Although this is an imperfect measure because people shop at other retailers, we see no reason to believe that there is any systematic bias The resultant item-purchase data set contains 22,913 individual item purchases, 2450 of which are made while cherry-picking

Buying at the lower price For each household, we compute the percentage of times that items are bought at the lower price (between Jewel and Dominick's) both when customers cherry-pick and when they shop at a single store Note that if Jewel and Dominick's offered the same price, we record that the shopper received the lower price As Table 5 shows, households are able to exploit the additional savings opportunities afforded by cherry-picking The probability of buying at the lower price is 8% greater when customers cherry-pick versus when they shop at a single store Consistent with other results in Table 5, the positive main effect of HH% CP suggests that heavy cherry pickers tend to be more vigilant shoppers (trait) irrespective of the type of trip (state)

Percent off the higher price Having established that consumers buy items at the lower price most of the time, we now turn to the question how much they save Figure 3 displays separate histograms of item-level savings off the higher price for cherry-picking and single-store purchases The histograms clearly show that cherry-picking shifts the distribution of percent savings to the right, reducing the number of zero and small savings and increasing the number of larger savings Because we have complete pricing

FIGURE 3
Percent Off the Higher Price by Purchase Occasion Type



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[3] Jewel and Dominick's together account for 65% of cherry-picking visits but 75% of all store visits The difference is explained by the number of possible store combinations If stores were chosen randomly, Jewel and Dominick's would have a 2/S (S = the number of grocery store chains in Chicago) probability of being chosen The random probability of both Jewel and Dominick's being chosen for cherry-picking would be ([S – 2]!H2!)/S!, however, which is much smaller given the number of grocers in the Chicago market

data at both Jewel and Dominick's for only ten categories and there are many trips on which households did not buy anything in those categories, we cannot compute savings on a trip-by-trip basis Consequently, we have elected to aggregate all purchases in the ten key categories for each household into two bins—cherry-picking trips and single-store trips—and then compute percent savings off the higher price using the two bins as household observations This aggregation enables us to avoid modeling the large proportion of missing observations and to analyze the data with a linear (WLS) model The resultant data set includes every household with at least three item-purchase observations at Jewel or Dominick's in a given state 113 households when cherry-picking and 187 households when shopping at a single store, for a total of 300 observations Note that we tested alternative screening criteria to include a household's single-store or cherry-picking observation in our data set, anywhere from a minimum of one to five item purchases Although the total number of household cherry-picking observations changed with the screening criterion, our findings did not

Similar to the results we obtained for the probability of buying at the lower price, Table 5 shows positive main effects of both HH% CP and CP Trip when percent off the higher price is modeled Shoppers save 46% more on each item when cherry-picking (15%) than when shopping at a single store (10%) This is consistent with our previous observation that the price per unit is 5% less when customers cherry-pick Moreover, the top quartile of cherry pickers saves substantially more on all shopping occasions (14%) than other shoppers (11%)

Savings generated by cherry-picking The previous analyses showed that people are on a shopping mission when they cherry-pick two stores, that is, the act of cherry-picking is premeditated and thought out For example, shoppers spend far more on cherry-picking days, nearly twice what they spend on single-store days A similar finding applies to the number of items bought This is not surprising because the shopper is visiting twice as many stores, but it suggests that the shopper planned on spending more than normal to take advantage of the extra store visit Thus, cherry-picking appears to be a case of planned opportunism (Hayes-Roth and Hayes-Roth 1979) Cherry-picking trips are associated with greater sensitivity to temporary price discounts and feature advertising, and customers generally pay lower prices than they do on single-store shopping occasions Moreover, these tendencies are magnified by the household's propensity to cherry-pick The overall portrait suggests that cherry pickers reside in the upper tail of the price sensitivity and deal proneness distributions

An important issue is whether there is any rational economic justification for cherry-picking Undoubtedly, shoppers may experience some transaction utility from being a market maven (Feick and Price 1987) or a smart shopper (Schindler 1992) Beyond these psychological benefits, however, it is interesting to find whether cherry pickers save enough money to justify the extra store visit Our priors were that the savings would be modest at best, it turns out that we were wrong

To quantify the savings that consumers reap from cherry-picking, we extrapolate from the average percent savings in the ten product categories for which we have detailed price information We calculate the savings per shopping trip as follows

for CP Trip = i ($i \in 0, 1$)

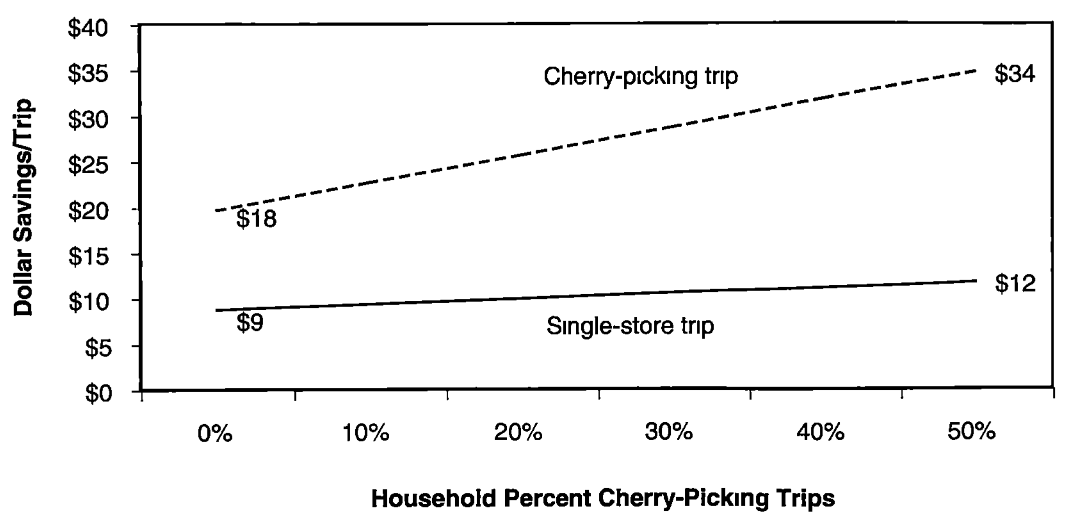
$$\overline{\text{savings/trip}_{hi}} = \frac{\overline{\text{spend/trip}_{hi}}}{1 - \left(\dfrac{\sum\limits_{k_{hi}=1}^{K_{hi}} \text{price}^{+}_{k_h} - \sum\limits_{k_{hi}=1}^{K_{hi}} \text{price}_{k_h}}{\sum\limits_{k_{hi}=1}^{K_{hi}} \text{price}_{k_h}} \right)} - \overline{\text{spend/trip}_{hi}},$$

where h indexes the household, K_{hi} is the number of item-purchase observations for household h when customers either cherry-pick ($i = 1$) or shop at a single store ($i = 0$), price^{+} is the larger price available on the item at Jewel or Dominick's, and price is the actual price paid Separating cherry-picking and single-store trips, this calculation scales the household's average percentage off the higher price (the quantity in parentheses in the denominator) by its average spending per trip

Table 5 shows that shoppers save over 160% more on cherry-picking versus single-store trips This occurs because trip savings is essentially the size of the shopping trip (cherry-picking trips are 68% larger) multiplied (as in the preceding equation) by the percentage off the higher price (45% greater for cherry-picking trips) By cherry-picking two stores rather than just one, shoppers save more than $14 ($23 56 – $8 90) on average Using average trip savings as the dependent variable, we estimate a WLS regression with the same predictor variables as in the other analyses in Table 5 Weights are proportional to the square root of the number of item purchase observations, K_{hi} Although the main effect of HH% CP is not significant, both the CP Trip main effect and the interaction are statistically different from zero The results are graphed in Figure 4 For households that seldom cherry-pick, we find that the savings when they cherry-pick is roughly twice the savings when they shop at a single store However, as cherry-picking experience increases, cherry-picking savings increase rapidly because of the interaction The difference between the two curves gives us incremental savings due to cherry-picking For the median cherry-picking household, which cherry-picks on 4 3% of shopping trips, this difference is $11 93 For a household in the 75th percentile of cherry-picking (10 1% of trips), the expected incremental savings is $13 34 For a household in the 90th percentile of cherry-picking (20 0% of trips), the expected incremental savings goes up to $15 76 These findings are insensitive to the weighting scheme, as a standard regression produces similar results

There appear to be two reasons that cherry pickers benefit more from the extra store visit First, they are more experienced and consequently more accomplished at taking advantage of the extra savings opportunities afforded by the extra store visit Second, their greater marginal benefit

FIGURE 4
Interaction Model of Cherry-Picking on Savings per Shopping Trip



results from the opportunistic planning of shopping trips into two types: much smaller single-store visits that may be fill-in trips and larger two-store trips in which they buy significantly more.

Cost/Benefit Analysis of Cherry-Picking

Is the decision to make an extra store visit on the same day economically justified? Across all shopper types, the incremental savings for cherry-picking versus single-store trips is $14.66. Habitual cherry pickers, by virtue of extended practice, enjoy greater incremental savings. For example, a household in the 90th percentile of cherry-picking propensity realizes $3.83 more in incremental savings per trip than a median cherry-picking household. If we assume Insight-Express.com's (2003) estimate of 47 minutes to make a shopping trip, the ratio of incremental savings per additional hour spent shopping is $18.49 = $14.66/.78 hours. Although this savings does not include time spent planning or direct transportation costs (e.g., gasoline, vehicle depreciation), it nonetheless compares favorably with prevailing after-tax wage rates.

Consider the following analysis. First, we compute the average wage rates of households in our data set. Dividing annual household income by the number of hours worked per year (2000 for a full-time, 1000 for a part-time employed adult), we find the average household wage rate to be $22.09 per hour for the 176 (of 201 total) households in which either a male or female head of household worked at least part time. We then compare each household's average wage rate with its expected incremental savings from cherry-picking.[4] For 33.5% (59 of the 176) of households, the incremental savings from an extra 47-minute store visit exceeded the average wage rate. In addition, the 25 households in which no adult worked (201 – 176) need not have forgone any wages to make an extra store visit when cherry-picking. Yet this analysis is conservative, overstating the opportunity cost of cherry-picking in several ways: (1) the incremental store visit while cherry-picking is likely to consume less time than the typical 47-minute visit because the shopper spends only $45 (see Table 6) compared with $71 (see Table 5) when single-store shopping, (2) cherry-picking trips are made more often on weekends, when opportunity costs are systematically lower (see Table 4), (3) if two adults in a household work, their average wage rate will almost certainly be higher than the minimum of the two, and (4) only 39% of households in our sample had working women and 18% had senior citizens. Building on the last point, 44 households in the sample included a nonworking adult along with one that worked. Given that these households also did not need to forgo wages to make an extra store visit, we find that for 63.5% ([59 + 25 + 44]/201) of households in our data set, the opportunity cost in wages of making an additional shopping trip was less than the expected savings due to cherry-picking. Irrespective of the assumptions made in computing the incremental costs and savings due to cherry-picking, there appears to be a strong economic justification for most households.

Cherry-Picking at Primary Versus Secondary Stores

The final issue of interest is how cherry-picking differentially affects retailers. Specifically, we focus on how cherry-picking behavior varies depending on whether the store is the shopper's primary grocery outlet or a secondary grocery outlet. The reasoning for this analysis is that it is one thing to be a shopper's primary store, where every so often the shopper cherry-picks the competition and thus spends a bit less money than on a single-store trip. It is another thing to be a secondary store, the one that is being cherry-picked. The shopper not only fails to spend as much there as in the

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[4] We compute the household's incremental savings using parameter estimates from Table 5 as follows: CP Savings = 11.4 + (24.4 H [HH% CP – median% CP]). Recall that we centered HH% CP on its median value for the original estimation.

TABLE 6
Primary Versus Secondary Store Visit Analyses for Cherry-Picking Trips

	Marginal Means			Parameter Estimates					
Variable	Secondary Store	Primary Store	Percent Difference	Analysis[a]	N	R^2[b]	HH% CP	Secondary Store	HH% CP × Secondary Store
Visit size (in dollars)	$45 01	$71 44	–37 0	OLS	5206	107	17 0** (5 4)	–15 8** (1 7)	–59 0** (6 9)
Visit size units	20 2	33 4	–39 5	OLS	5206	082	9 50** (3 08)	–8 24** (95)	–27 6** (3 9)
Percentage of items bought at discounted prices	40 4%	36 2%	11 6	Tobit	4818	004	– 167** (037)	– 0136 (0126)	244** (055)
Percentage of items bought that are advertised	29 3%	22 2%	31 8	Tobit	4818	010	– 119** (040)	0262* (0135)	180** (059)
Price per unit (indexed measure)	936	972	–3 6	OLS	2450	003	– 137 (089)	– 0332 (0301)	– 001 (130)
Quantity (indexed measure)	1 009	1 052	–4 1	OLS	2450	003	218 (118)	0024 (0399)	– 265 (173)
Probability of buying at the lower price	79 4%	76 3%	4 1	Logistic	2450	006	418 (451)	– 049 (149)	1 30 (68)
Percent off higher price	15 7%	13 5%	16 4	WLS	152	074	0212 (0654)	0040 (0145)	185* (094)
Savings per store visit	$9 72	$11 92	–18 5	WLS	152	042	6 35 (6 63)	–2 68 (1 47)	4 73 (9 49)

*α = 05
**α = 01

[a] For most continuous dependent variables, OLS is used For continuous dependent variables that are the means of unequal numbers of observations (e g , savings per trip for each household), WLS is used, the weight assigned to each observation is proportional to the square root of the number of observations that compose the dependent variable (e g , the square root of the number of savings observations for each household) Logistic regression is used when the dependent variable is binary Censored regression is used for continuous dependent variables that are bounded below at zero and where there are several zero observations (e g , the proportion of feature-advertised products purchased on a given trip)

[b] For tobit regressions, a pseudo R^2 that approximates the percentage of variance explained is reported, for logistic regressions, U^2 is reported (U^2 and R^2 are not directly comparable)

primary store but also opportunistically buys more sale items For each household, we designated as its primary store the grocery chain at which the household spent the most money over the two-year period All other stores were designated secondary outlets

We estimate regressions using the same dependent variables as in Table 5 However, this analysis involves store visits at primary and secondary outlets rather than store trips Note that these store visits are all made on cherry-picking days The predictors for these regressions are (1) the trait variable HH% CP, (2) Secondary Store, an indicator for whether the visit was made to a secondary outlet that captures trip-specific (i e , state) differences, and (3) the interaction of the two We again centered HH% CP on its median value, so the main effect of Secondary Store assumes a household with a median-level propensity to cherry-pick We coded Secondary Store (1 = yes, 0 = no) so that the main effect of HH% CP assumes a visit to the primary rather than a secondary outlet

Table 6 shows the results Cherry-picking visits at secondary outlets are systematically smaller than those at primary outlets, 37% in dollars and 40% in units This is not surprising given that shoppers are more familiar with their primary store We also observe that shoppers are more likely to buy discounted (12% more) and feature-advertised (32% more) items at the secondary store However, the negative main effect of HH% CP and the positive interaction in the two promotional analyses suggest a slightly more complicated picture Heavy cherry pickers show a much larger increase in the probability of buying discounted or feature-advertised items when shopping in secondary stores compared with their primary shopping outlet than do lighter cherry pickers The large difference in the feature-advertising variable (32%) suggests that a sizable group of consumers may plan their secondary store visits on the basis of a perusal of that week's best food day advertising circular The rest of the shopping behaviors analyzed in Table 6 show no systematic differences between visits to primary and secondary stores And though shoppers save 18% more in their primary outlet, the savings is proportionally greater in secondary stores because spending on visits to primary stores is 38% larger

In summary, we find that secondary stores are hurt more (proportionately) by cherry-picking than is a household's primary outlet The pain is compounded by the shopper's propensity to cherry-pick, which has a significant moderating effect The primary driver of secondary stores' disadvantage seems to be smaller purchase amounts, which are substantially smaller, rather than systematically greater price sensitivity or deal proneness Moreover, differences in price sensitivity and deal proneness seem to be limited to experienced cherry pickers

We also note that a visit to the primary store in many ways resembles a single-store shopping trip Comparing column 3 in Table 5 to column 3 in Table 6, we find strong similarities in the values for single-store trips and primary outlet visits during cherry-picking The only differences are that shoppers are more sensitive to deals and advertising and consequently are more likely to save money off the higher price

Discussion, Implications, and Further Research

In this article, we examine buyer-side cherry-picking, asking and answering three previously open questions First, which household-specific and trip-specific factors lead to cherry-picking? Second, is cherry-picking worthwhile for consumers in the sense that the savings realized from visiting two grocery stores on the same day is economically justified? Third, how badly is the retailer hurt by this extreme manifestation of price sensitivity? Our research strategy was to examine cherry-picking as both a state (whether the consumer chooses to cherry-pick on a given shopping trip) and a consumer trait (the household's overall propensity to cherry-pick) We found that several characteristics are predictive of a household's propensity to cherry-pick a working woman in the household [–], a senior citizen head of household [+], a larger family [+], household income [–], and home ownership [+] We also found that the proximity of local stores to each other facilitates cherry-picking, though the proximity of the store to the shopper's home does not Analysis of trip-specific factors showed that shoppers are more likely to cherry-pick on the weekend than on weekdays, cherry-picking also increases when household inventories are depleted because shoppers have not shopped recently or their most recent basket purchase was small

We uncovered substantial differences in shopping behaviors due to cherry-picking, involving both the trait (household propensity to cherry-pick) and the state (cherry-picking on a given trip) Shoppers buy much more when cherry-picking than when shopping at a single store—in the case of frequent cherry pickers, twice as much Not surprisingly, cherry-picking trips involve the purchase of a higher percentage of discounted items than do single-store trips, at least partly because cherry-picking trips evidence greater attention to retailers' weekly feature advertising Inveterate cherry pickers buy more feature-advertised and discounted items whether or not they are cherry-picking In the same vein, shoppers pay lower prices per unit when they cherry-pick and are more likely to select items at the lowest price available in the market, as multistore shopping theory predicts In addition, frequent cherry pickers buy in larger quantities than do less frequent cherry pickers, suggesting that they are more willing to incur inventory-holding costs to reduce their per-unit prices, which we also found to be significantly lower These systematic differences in shopping behavior suggest that cherry-picking is a case of planned opportunism, in which shoppers exploit the additional deals available from visiting multiple stores across a larger basket of goods Moreover, the portrait of the frequent cherry picker that emerges is a shopper who is opportunistic on all trips, exploiting price deals and buying larger sizes regardless of whether they cherry-pick on a particular day

Our analysis of the economic benefits of cherry-picking revealed two related but separate ways consumers save money when visiting two grocery stores on the same day First, two same-day store visits afford shoppers more opportunities to save money, especially when they can plan their shopping with information from feature advertisements Accordingly, we found that cherry-picking affords shoppers approximately 5% extra savings per item across the total shopping basket This is only one aspect of cherry-picking, and arguably not the most important one, from a consumer welfare perspective The second way that cherry-picking generates consumer surplus is that shoppers plan their cherry-picking days and purchase more (over two-thirds more on average) on such occasions, so shoppers apply the 5% savings to a much larger expenditure than they would normally make on a single-store shopping day We recognize that the size of the cherry-picking basket is endogenous, it both affects (Carlson and Gieseke 1983) and is affected by the decision to cherry-pick

Finally, we considered the impact of cherry-picking on the retailers being cherry-picked This is difficult to assess in the absolute, though comparing the extra consumer surplus extracted while cherry-picking to supermarket gross margins of roughly 25% and net margins of 1 5%–2% suggests that cherry-picking has a material effect on customer profitability Cherry-picking gives shoppers access to more of the surplus, 5% more off the premium (higher) market price per item Yet much of this savings on cherry-picking trips is due to the purchase of more promoted items, for which the consumer surplus is subsidized by manufacturer discounting Thus, the burden of cherry-picking is borne by both retailer and manufacturer, and manufacturers sell more on deal as a result Also of interest to manufacturers is the negative correlation between cherry-picking and brand loyalty Returning to the retailer's perspective, we note that households that cherry-pick more often also have more family members and thus consume more goods, which implies that cherry-picking households may generate more retailer revenues This is true for our sample, we find that the top quartile of cherry-picking households spends $576 per month, whereas households that cherry-pick less frequently spend only $498 per month The additional spending of frequent cherry pickers increases their attractiveness to retailers, but their lower loyalty—they spend only 47% of their grocery budget at their primary store versus 68% for other households—suggests that the extra revenues are spread more equally across retailers It is clear that cherry-picking shoppers are far more likely to be unprofitable for their secondary stores than for their primary store Secondary stores not only sell less per shopper ($45 versus $71) but also make lower margins on what they sell to cherry pickers The predicament of secondary stores suggests that it may be more important for retailers to become the preferred store for their customers who frequently cherry-pick than to increase the loyalty of single-store shoppers Cherry-picking is an economically justifiable form of price search that is employed by a substantial percentage of the population, and it is here to stay Whether by implementing effective loyalty programs or by modifying pricing and promotion strategies, retailers would profit more by serving than by lamenting these shoppers, who really do "pick the best and leave the rest"

This study focuses on identifying and describing buyer-side cherry-picking behavior In light of our empirical findings, several questions remain Is cherry-picking a sequential search process as our theory assumes and thus dependent on the prices observed at the first store, or is it truly premeditated on the basis of shoppers' expectations about prices at the two stores? Answering this question would require testing alternative models of the behavior In light of our findings linking promotional response to cherry-picking trips and a household's propensity to cherry-pick, it would also be useful to explore the relationship between promotions and cherry-picking By exploring this relationship, further research might address how a retailer's promotional decisions influence whether customers cherry-pick its stores and whether frequent cherry pickers shop there Another empirical finding related the propensity to cherry-pick to the distance between stores near the shopper's home The cost of an additional shopping trip likely depends on other factors, including the size of the store (smaller stores are easier to shop) and the time of day (off hours mean shorter checkout lines) Exploring these factors represents another interesting research opportunity, though it would require additional data

We held cherry-picking behavior up to the lens of a theory of multistore shopping that is grounded in economic rationality (Burdett and Malueg 1981, Carlson and McAfee 1984), but we did not consider the psychological benefits of cherry-picking A study that focuses on the psychological benefits, or better still incorporates them along with the economics of cherry-picking, would be compelling Another topic of interest is the importance of cherry-picking from the point of view of the retailers' and manufacturers' sales and profits The trade press claims that cherry-picking has a material effect on retailer performance (e g , MMR 2002), assessing such claims could be quite useful An additional potentially important topic for study is the effect of cherry-picking on retail customer loyalty and lifetime value With customer "share of wallet" and customer relationship management being increasingly of interest to retailers, studying the effect of cherry-picking on store selection could also make a meaningful contribution

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Werner Reinartz, Jacquelyn S. Thomas, & V. Kumar

Balancing Acquisition and Retention Resources to Maximize Customer Profitability

In this research, the authors present a modeling framework for balancing resources between customer acquisition efforts and customer retention efforts. The key question that the framework addresses is, "What is the customer profitability maximizing balance?" In addition, they answer questions about how much marketing spending to allocate to customer acquisition and retention and how to distribute those allocations across communication channels.

Measuring, managing, and maximizing customer profitability is not an easy task. It requires that in resource allocation decisions, both the benefits and the costs of marketing, sales, and customer interactions are considered. In this research, we conceptualize the marketing resource allocation problem in terms of determining how much to spend on customer acquisition and customer retention and how those expenditures are allocated. Given this conceptualization, the fundamental marketing resource allocation question is, "What is the right balance of resources that optimizes customer profitability?"

Prior research has examined parts of these issues, but to date, there has not been a comprehensive examination of marketing resource allocation that focuses on all three following questions: How much? How? and What is the profit-optimizing balance? For example, Blattberg and Deighton (1996) address the question of how much to spend on customer acquisition and customer retention. However, they stop short of simultaneously considering acquisition and retention spending, which is critical to address the issue of balancing resources.

Using Blattberg and Deighton's (1996) framework, Berger and Nasr-Bechwati (2001) assume a budget amount and then suggest a model to address how that budget should be allocated between acquisition and retention. However, their model is not tested empirically. In contrast, in this research, we propose an integrated approach that sheds statistical insight on this issue and thus goes beyond the deterministic approach that Berger and Nasr-Bechwati provide.

Mantrala (2002) points out that Blattberg and Deighton's (1996) approach is only a first step and that there is great scope for more research into customer profitability–based decision modeling of the marketing resource allocation problem. However, this problem is not straightforward, as Hanssens (2003, p. 16) highlights:

> The more challenging task is to assess long run marketing effectiveness and to allocate the overall marketing budget across the key activities that generate customer equity. For any given set of business and customer response parameters, there is an optimal level of customer acquisition and retention which translates into optimal acquisition and retention spending levels.

Prior models have begun to investigate these issues. For example, Blattberg, Getz, and Thomas (2001) incorporate acquisition, retention, and cross-buying into a model of customer lifetime value and customer equity but do not identify the specific impact of marketing expenditures on customer profitability. Thomas (2001) examines the link between customer acquisition and customer duration. Reinartz and Kumar (2000, 2003) examine the link between customer duration and customer profitability. Rust, Lemon, and Zeithaml (2004) address both acquisition and retention aspects, but their model does not provide for separate or distinct investments in the acquisition of new customers and the retention of existing customers. Although Rust, Lemon, and Zeithaml's approach enables a trade-off analysis between different aspects of the marketing mix, it does not provide for an understanding of how to trade off specific investments at different points in the customer–firm relationship. Bolton, Lemon, and Verhoef (2004) provide a conceptual model for linking marketing actions and expenditures to customer retention and profitability but do not provide empirical results. Focusing only on existing customers, Venkatesan and Kumar (2004) develop a resource allocation model that provides guidance on how much to invest in distinct communication channels. By estimating the frequency of buying and the change in the contribution margin from one period to the next, they compute and seek to maximize the future value of the firm's existing customer base. In terms of the data similarities and the discussion of spending

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Werner J. Reinartz is Associate Professor of Marketing, INSEAD (e-mail: werner.reinartz@insead.edu). Jacquelyn S. Thomas is Associate Professor of Integrated Marketing Communications, Northwestern University (e-mail: jakki@northwestern.edu). V. Kumar is ING Chair Professor and Executive Director, ING Center for Financial Services, School of Business, University of Connecticut (e-mail: vk@sba.uconn.edu). The authors thank the *JM* reviewers and the participants of the 2003 Marketing Science Conference for their valuable comments on a previous version of the article. They also thank the high-tech firm for providing access to the data, without which this study would not have been possible. All authors contributed equally.

across communication channels, substantively our research is similar to that of Venkatesan and Kumar However, our research takes a more longitudinal perspective and examines resource allocations more comprehensively because it begins before the successful acquisition of a customer We depict a conceptual view of our perspective in Figure 1

A natural extension to the contributions made by the previous studies is a conceptual framework and model that can be used to balance resource allocations between customer acquisition and retention and whose objective is to maximize the firm's long-term profitability It is important that the model be flexible enough to address simultaneously how much and how to invest This study is that extension Specifically, Figure 1 conceptually depicts the key processes in the evolution of the customer–firm relationship In addition, our study presents a comprehensive system of equations that links the acquisition and retention processes to customer profitability and can be used for resource allocation decisions Because of the linkage, the system can be used to assess the trade-offs that occur in resource allocation decisions It is important to acknowledge that our approach necessitates that resources can be split between customer acquisition and retention, which is the case in many business-to-business (B-to-B) or direct marketing contexts

Based on the existing research, our specific objectives in this article are to

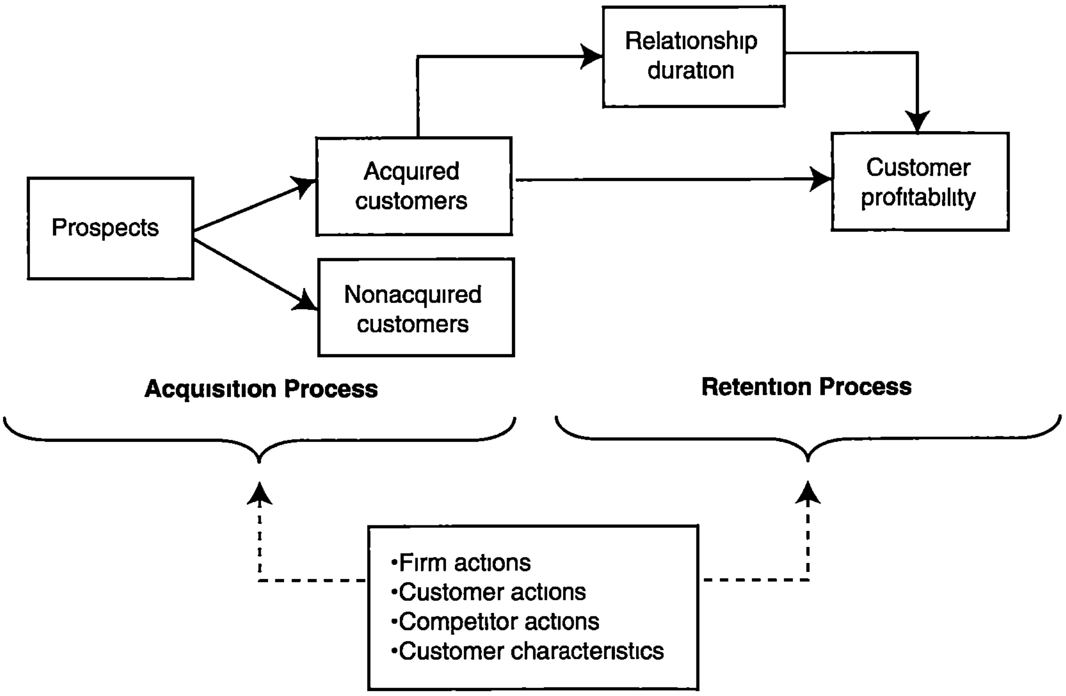
1 Present a resource allocation model that addresses the questions of how much to invest in customer relationships and how to invest at different points of the customer–firm relationship,
2 Illustrate the application of the statistical model with an empirical example, and
3 Show by a simulation how varying different inputs to the model (e g , expenditures, number of communication contacts) affects acquisition rates, retention rates, customer profitability, and the magnitude of the firm's return on investment

The context in which we address the issue of balancing resource allocations is customer contact strategies However, the framework that we provide can extend beyond the customer contact strategy With the rise of the Internet and electronic technology, the question of how firms should interact with their customers is gaining in importance, especially as firms consider the cost differences between traditional communications media, such as television and sales forces, and electronic media, such as the Web and e-mail

Allocating Resources to Customer Contact Channels

To answer the questions of how much to spend on customers and how to allocate expenditures, we must understand the key drivers of customer profitability (for a review, see Berger et al 2002) [1] Given our data, the specific drivers

FIGURE 1
Linking Customer Acquisition, Relationship Duration, and Customer Profitability



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[1] We use the terms "customer profitability" and "customer value (to the firm)" interchangeably in this research Both expressions represent a multiperiod measure of the economic value of a cus-

that we focus on relate to customer contact channels The allocation of a budget to customers and across different contact channels is a classic problem that has gained heightened attention in today's multichannel environment However, typical media planning investigations have been conducted at the firm level (see, e g , Aaker 1975, Rust 1986) According to Tellis (2003, p 45), the use of the most disaggregate measure—the individual customer—is probably most appropriate for allocating media expenditures because persuasion is created at the individual level and because media increasingly can be targeted at the individual level Therefore, an individual-level investigation is a contribution of our study

At the most simple level, different contact channels may have independent effects on a specific dependent variable Contact channels (e g , personal selling, telephone, direct mail, e-mail) have been characterized as more or less interpersonal Personal selling, at one extreme of the communications continuum, is dyadic in nature, offers the ability for message customization, enables rich interaction, and allows for personal relationship building (Moriarty and Spekman 1984, Stewart and Kamins 2002) Venkatesan and Kumar (2004) find that higher-level bidirectional communication is associated with higher purchase frequencies Prior research also asserts that if the buying environment can be described as high involvement decision making (such as a B-to-B purchase), a more involving and interpersonal contact channel, such as a personal sales call, will have a much higher conversion rate on average than will a less involving contact channel, such as e-mail or telesales (Anderson and Narus 1999, p 302) Therefore, the ability to customize the message easily and build personal bonds with customers will eventually lead to greater retention through personal selling, especially in B-to-B settings In addition, research has shown that buyers and sellers that have strong personal relationships are more committed to maintaining their relationships than are less socially bonded partners (Mummalaneni and Wilson 1991)

Extrapolating prior findings to this context suggests that more interpersonal channels will have a greater positive impact on customer acquisition (Mohr and Nevin 1990, Moriarty and Spekman 1984) Similarly, more interpersonal contact channels will be associated with greater customer retention compared with less interpersonal contact channels However, there is little theory or rigorous testing to focus our understanding about the efficacy of contact channels with regard to customer profitability Thus, a unique aspect of this research is that it addresses the issue of the marginal efficiency of contact channels with respect to customer acquisition and two longitudinal performance measures customer retention and long-term customer profitability

An important consideration when investigating the impact of communication modes is the potential interaction effect between contact channels The investigation of interaction effects between different promotional vehicles is complex and rarely addressed by researchers (Sethuraman and Tellis 1991) According to Farris (2003), there is a need to develop resource allocation models that reflect media synergies and interactions For example, Jagpal (1981) studied radio and print advertising for a commercial bank and was the first to present empirical evidence of synergy in multimedia advertising More recently, Naik and Raman (2003) find empirical evidence for the existence of synergistic effects between television and print media In a hypothetical scenario, Berger and Nasr-Bechwati (2001) account for the possibility of media interaction effects in their deterministic model of customer equity Yet so far, no customer profitability approach has modeled empirically the interaction between the marketing-mix variables In addition, the empirical tests have all been conducted at the aggregate level

In addition to the marginal effects, this study empirically tests for the synergistic effect of multiple communications media on individual consumers' acquisition, retention, and profitability Investigating the impact of media interaction on the allocation decision for each of the dimensions is critical because it demonstrates whether it is necessary to change the communications strategy at different stages of the customer life cycle For example, customer acquisition might be optimized by means of more (highly involving) personal sales calls, but when customers have been acquired, the retention strategy may be most effectively managed by less obtrusive or less interpersonal communication, such as e-mail or Internet-based interactions The idea that different types of communication channels play varying roles in the acquisition and retention processes has only been discussed conceptually so far (Dwyer, Schurr, and Oh 1987) We investigate this assertion empirically in a B-to-B setting Thus, the testing of the effect of media synergies on individual customers' behavior is another unique aspect of this research

Data

Data for the study come from a large, multinational, B-to-B high-tech manufacturer The company's database includes firms that function in B-to-B and business-to-consumer (B-to-C) markets The product categories in the database represent different spectra among high-technology products Even though the products are durable goods, they require constant maintenance and frequent upgrades, this characteristic provides the variance required to model the customer response The choice of vendors for the products is normally made after much deliberation by the buyer firm For the product categories, the buyer and seller choose whether to develop their relationships, and there are significant benefits to maintaining a long-standing relationship for both buyers and sellers

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tomer to the firm, expressed in contribution margin terms Although the term "customer lifetime value" has been used abundantly in that context, we refrain from doing so Conceptually, there may be reservations about using "customer lifetime value" because it implies complete knowledge (i e , past and future) about a customer's value to the firm We do not take such a viewpoint

The data used in the study cover a four-year period from the beginning of 1998 to the end of 2001. All of the customers are new to the firms and made their first purchase from the manufacturer in the first quarter of 1998. A total of 12,024 prospects were contacted for potential acquisition, and of those, 2908 made at least one purchase in the first quarter of 1998. The average interpurchase time for an individual customer ranged between 1.5 and 21 months.

To help the manager make an allocation decision, he or she has at his or her disposal information about each prospect before acquisition and each customer after acquisition, as follows[2]: date of each purchase, number of proactive manufacturer-initiated marketing campaigns before that date, type of campaign (face-to-face, telephone, e-mail), and the number of customer-initiated contacts with the supplier firm (through the Web). From this information, we constructed the variables FACE-TO-FACE, TELEPHONE, EMAIL, and WEB to measure the number of contacts that the firm had with the customer through the specific contact mode. In the acquisition equation, the variables represent the total number of preacquisition contacts in each channel before the first purchase. In the duration equation, the variables measure the total number of contacts in each channel after the first purchase. In the profitability equation, the variables are operationalized as every contact (pre- and postacquisition) that the customer has with the firm. If any two modes of contact with a customer or prospect occurred in a given month, we formulated an interaction term between those two contacts. Specifically, we operationalized the interaction terms as the number of times any two communication modes occurred in the same month,[3] which helped us assess whether the use of two different contact modes (e.g., telephone and e-mail) in a given period provides added effectiveness.[4]

Additional decision variables under the firm's control are the amount of acquisition dollars spent for each prospect (ACQUISITION DOLLARS) and the amount of retention dollars spent for each customer (RETENTION DOLLARS). These dollar expenditures are allocated to the four different communication channels. Thus, the expenditure amounts cannot change without adjustments in the allocation of effort to the communication channels. In addition to linear terms for the expenditures, we also included quadratic terms for acquisition dollars (ACQUISITION DOLLARS^2) and retention dollars (RETENTION DOLLARS^2) in the model. As firms increase their acquisition and retention budget, the associated acquisition rate, retention rate, and customer profitability will be less responsive (concavity). So far, this effect has not been demonstrated in empirical customer lifetime value literature, except for the deterministic (not statistical) approach taken by Blattberg and Deighton (1996). The quadratic terms do not impose a curvature but help uncover nonlinear effects (e.g., diminishing marginal effects) of the relationship between the expenditure and the dependent variables.

We calculated customer profitability (PROFIT) by subtracting direct (product-related) cost, total retention costs, and acquisition cost from the total revenues the customer generates for the firm during the observation period.

Control Variables

We introduce several covariates to control for exchange and customer characteristics. Exchange characteristics that may have important bearings on the different dependent variables include customer-initiated contacts, the degree of cross-buying, the frequency of transactions (e.g., Reinartz and Kumar 2003), the customer's share-of-wallet with the focal firm (e.g., Verhoef 2003), and the relationship duration (Bolton 1998; Bolton and Lemon 1999; Reinartz and Kumar 2000).

In this context, the firm records the number of customer-initiated contacts that is executed through the Internet. From a utility perspective, customers who have greater expected benefits and utility from an ongoing relationship are more likely to commit to it. Customer-initiated contacts are a way to signal this commitment, and there is ample evidence that frequency of communication is positively associated with a partner's commitment (Anderson and Narus 1990). We introduce this count measure as a covariate for all three dependent variables.

Cross-buying, which is an indicator of stronger relationships (Kamakura et al. 2003), should have a potential impact on both relationship duration and customer profitability. We operationalize the variable CROSS-BUY as the number of different categories from which the customer buys.

Frequency of transactions is also a sign of the quality of a relationship (Anderson and Weitz 1992; Kalwani and Narayandas 1995) and therefore should have an impact on both relationship duration and customer profitability. We operationalize the variable FREQUENCY as the number of purchase occasions for each customer.

The firm's share-of-wallet with a particular customer captures the competitive aspect. As a customer allocates relatively more category purchases to a focal vendor, competitors have less access to the customer. Firms that own a greater share-of-wallet of their customers have a strategic advantage over their competitors. A larger share-of-wallet allows for (and requires) greater learning about customer requirements, allows for (and requires) more communication between the parties, and justifies greater relationship-specific investments (Anderson and Narus 2003). Thus, a larger share-of-wallet should have an impact on relationship duration and customer profitability. We operationalize the variable SOW as the percentage of the customer's information technology budget that is spent with the focal firm.

Finally, we introduce the LENGTH OF RELATIONSHIP as a covariate for modeling customer profitability. The expectation with respect to relationship duration and customer profitability is that as the length of the customer tenure rises, it allows for more transactions (volume and frequency). If the transactions are profitable, there should be overall greater relationship profitability (Kamakura et al. 2003; Reinartz and Kumar 2000).

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[2] The manager here refers to the manager at the firm who supplied the data.

[3] A limitation of the data is that we cannot distinguish an interaction between media from a media pulsing strategy. Therefore, we may underestimate the true level of media interactions in the data.

[4] In these data, there are no incidences of more than two contact modes used in the same month.

To control for observed heterogeneity across customers, we include additional determinants in the specification. The three available variables represent the following characteristics of the potential targets: type of industry, annual revenues, and number of employees. The variable INDUSTRY TYPE classifies customers as either B-to-B or B-to-C firms. In addition, we use ANNUAL SALES REVENUE ($ millions) and SIZE OF FIRM (number of employees) in this analysis.

Based on these data, the model underlying this research and the potential drivers of acquisition, duration, and customer profits appears in Figure 2. Figure 2 is a conceptual representation of the three equations that make up our statistical model. In terms of the statistical specification, all three equations are similar with respect to firm (e.g., expenditure amounts, communication channels) and customer (e.g., Web-based communications) action variables. In addition, customer characteristics enter the acquisition equation because the information is available for each prospect. Through the correlation structure, the duration and profit equations also capture the influence of these customer characteristics. Finally, the control variables for customer behavior (e.g., FREQUENCY, SOW, CROSS-BUY) are applicable only to acquired prospects and thus only appear in the duration and profit equations.

Right Censoring

Because of the noncontractual nature of the relationship, customers are subject to silent attrition. Our model includes an estimate of the customers' relationship duration, and we therefore must account for the possibility of right censoring. This possibility was established with the use of Allenby, Leone, and Jen's (1999) approach to compute the expected time until the next purchase. If the expected time until the next purchase exceeds the time elapsed since the last purchase, the account is considered active and the duration is considered right censored. If this is not the case, the relationship is assumed to have been terminated at the last purchase.

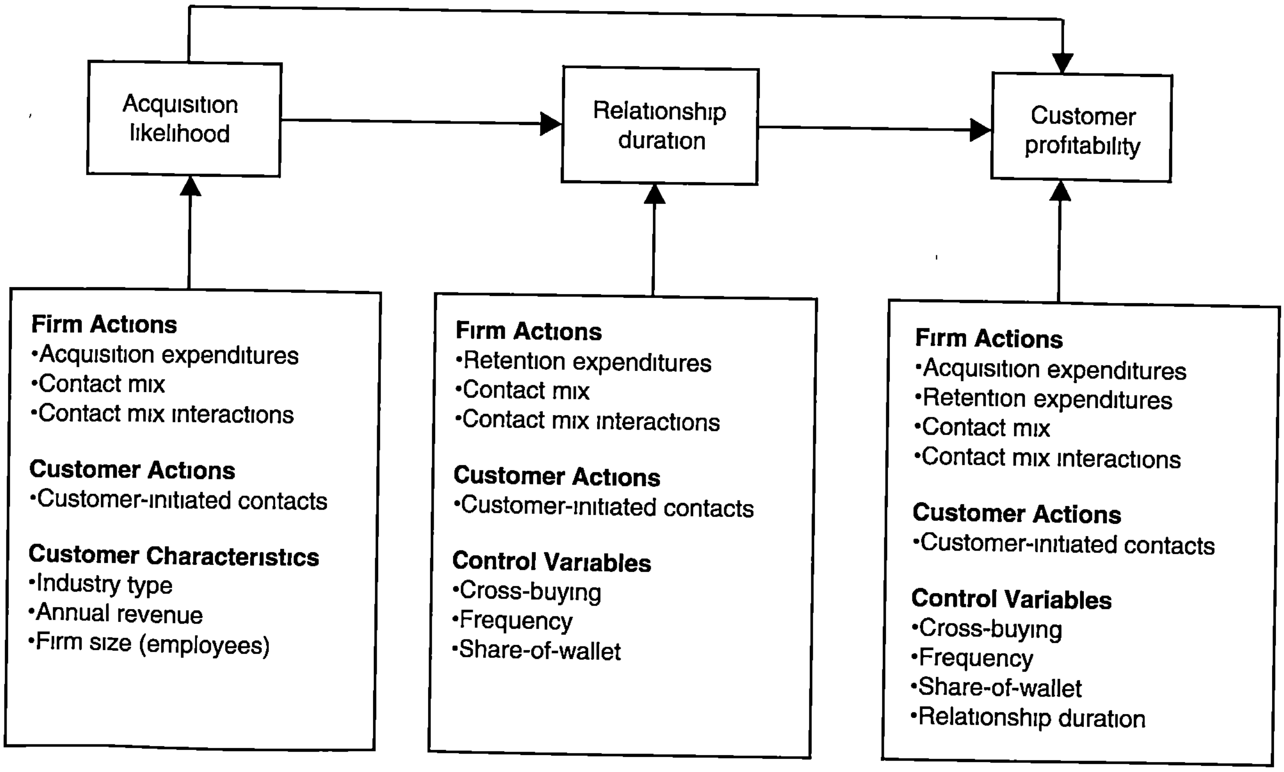
We provide descriptive statistics in Table 1. The unique strength of the data set lies in the availability of individual-level marketing-mix contacts/communications, costs associated with the channel contacts, and profile data. These data enable us to use individual-level models and derive optimal marketing guidelines for each individual customer or at the segment level.

Research Methodology

Statistical Model

To link customer acquisition, relationship duration, and profitability, we use a system of equations known as a probit two-stage least squares model. We provide mathematical representations of the model in Equations 1, 2, and 3.

FIGURE 2
Determinants of Focal Constructs



(1) $$y_{Li} = \beta'_{Ls}x_{Li} + \gamma'_s y_{Di} + \varepsilon_{Lis} \quad \text{if } z_i = 1$$

(Cumulative profitability equation)

$$= 0 \text{ otherwise}$$

(2) $$y_{Di} = \beta'_{Ds}x_{Di} + \varepsilon_{Dis} \quad \text{if } z_i = 1$$

(Duration equation)

$$= 0 \text{ otherwise}$$

(3) $$z_i^* = \alpha'_s v_i + \mu_{is} \text{ (Acquisition equation)}$$

$$z_i = 1 \quad \text{if } z_i^* > 0$$

$$z_i = 0 \quad \text{if } z_i^* \leq 0,$$

where

z^*_i = a latent variable indicating customer i's utility to engage in a relationship with the firm,
z_i = an indicator variable showing whether customer i is acquired ($z_i = 1$) or not ($z_i = 0$),
v_i = a vector of covariates affecting the acquisition of customer i,
y_{Di} = the duration of customer i's relationship with the firm,
x_{Di} = a vector of covariates affecting the duration of customer i's relationship with the firm,
y_{Li} = the cumulative profitability of customer i,
x_{Li} = a vector of covariates affecting customer i's lifetime value,
α_s, β_{Ls}, β_{Ds} = segment-specific parameters, and
μ_{is}, ε_{Lis}, and ε_{Dis} = error terms

In this recursive simultaneous equation model, a probit model determines the selection or acquisition process, and two distinct regression equations (in this context, they are censored regressions) characterize duration and long-term customer profitability Logically, the duration and customer profitability are observed only if the customer is acquired Thus, the duration and profitability equations are conditional regressions determined partly by the acquisition likelihood of a customer[5]

TABLE 1
Descriptive Statistics

	Preacquisition Sample*		Acquired/Selected Sample**	
	Mean	Standard Deviation	Mean	Standard Deviation
Independent Variables				
Acquisition dollars per person	581	101	508	77
Acquisition dollars^2	342,118	10,180	269,496	5,829
Retention dollars per person			1506	209
Retention dollars^2			2,281,741	43,693
Contact Channel**				
Telephone	3 1	1 8	13 4	3 6
Face-to-face	1	1	2 4	6
Web	2	1	1 2	4
E-mail	2 7	2 1	15 1	4 2
Telephone × e-mail	6	2	3 1	4
Face-to-face × e-mail	02	005	6	1
Cross-buying			4 2	1 8
Frequency			8 8	3 1
Frequency^2			79 87	72 8
Share-of-wallet			41 6	8 2
Lambda			48– 71 range	2
Firmographics				
Industry type (B-to-B)	56%	5		
Annual sales revenue	40 2	39 6		
Size of firm (employees)	212	96		
Dependent Variables				
Duration (days)			1380	141
Predicted duration (days)			1339	133
Lifetime values ($)			356,280	28,712
Percentage right censored			41	

*The data reported refer to the entire pool of acquired and nonacquired people before acquisition

**In the preacquisition sample, these figures only represent acquisition contacts In the acquired sample, the numbers represent the total number of contacts throughout the customer–firm relationship

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[5] Although at first glance, Equation 3 does not seem to be part of the system of equations, a selectivity correction term will be specified for the estimation of Equations 1 and 2 to correct for selec-

The linkages among the three equations in a probit two-stage least squares model are captured by the error structure of the model. Specifically, this model assumes that the error terms (ε_{Lis}, ε_{Dis}, and μ_{is}) are multivariate normal with a mean vector zero and a covariance matrix as specified in Equation 4 (Lee, Maddala, and Trost 1980; Roberts, Maddala, and Enholm 1978).

$$(4)\qquad \Sigma = \begin{pmatrix} \Sigma_{LL} & \Sigma_{LD} & \Sigma_{L\mu} \\ & \Sigma_{DD} & \Sigma_{D\mu} \\ & & 1 \end{pmatrix}$$

Because of the recursive structure of the system of equations (Equations 1–3), this model can be estimated in stages (Roberts, Maddala, and Enholm 1978). Amemiya (1974) and Heckman (1976) have established precedence for multistage estimation methods for these types of models. The first step is to estimate the probit model on all the data (i.e., acquired and nonacquired prospects). With the use of the estimated parameters from the probit, a selectivity variable, lambda (λ_{is}), is constructed for the acquired customers and included as an independent variable in the duration and cumulative profitability equations. In managerial terms, the lambda captures the interaction between customer acquisition and retention and customer acquisition and profitability. Mathematically, the lambda variable is an artifact of the correlation between the error term in the acquisition equation (Equation 3) and each of the errors in the conditional regression equations (Equations 1 and 2). Given this correlation, unbiased parameter estimates are obtainable only by taking conditional expectations of the error terms. The result of this process is the specific functional form of the selectivity variable represented in Equation 5.

$$(5)\qquad \hat{\lambda}_{is} = \frac{\phi(\hat{\alpha}_s v_i)}{\Phi(\hat{\alpha}_s v_i)}$$

We refer to Equation 5 as the inverse mills ratio, where $\phi(\cdot)$ is the standard normal density function, and $\Phi(\cdot)$ is the cumulative standard normal function. This ratio is a monotonically decreasing function of the probability that a customer is acquired or selected into the sample (Heckman 1979; Roberts, Maddala, and Enholm 1978). Although this method for estimation and bias correction in selection models has its basis in econometrics literature, similar bias correction approaches have been applied in marketing contexts (Krishnamurthi and Raj 1988; Winer 1983).

The second step of the process is to estimate the duration model with regressors, including the estimated lambda in Equation 5 and the relevant covariates that affect duration. Estimation in the second step distinguishes between the noncensored and the right-censored observations. It is performed using a standard right-censored Tobit model. With the estimated parameters and the data from the acquired sample, a forecast is made about the expected relationship duration for each customer. This forecast is used as a covariate in the third step.

In the third step, customer profitability is estimated with regressors, such as a vector of exogenous variables that affect the long-term profitability of a customer, the forecasted relationship duration from the second step, and the estimated lambda from Equation 5. The cumulative profitability model specified in Equation 1 is also estimated with a standard right-censored Tobit model.

Covariance Correction

Although it is computationally simpler to estimate it in stages, proper inference requires that the standard errors of the estimates account for the additional sources of variance introduced by using estimated parameters in the second and third steps. Lee, Maddala, and Trost (1980) provide a detailed account of the correct variance–covariance matrix for the parameters of this model. Consistent with their research, we correct the covariances of our estimates to obtain consistent parameter estimates.

Unobserved Heterogeneity

In addition to right censoring, our system of simultaneous equations also accounts for unobserved heterogeneity among customers. In this research, we apply a latent-class segmentation approach (Kamakura and Russell 1989) to account for unobserved heterogeneity at the segment level. There can be a different number of segments for the selection/acquisition process and a different number that best characterizes the duration and/or customer value models. By estimating the model in steps, we allow for this flexibility. Consequently, we can choose the appropriate heterogeneity specification for each step in the model.

Discussion of Results

Model Selection

Consistent with the latent-class segmentation approach, we estimated the model assuming a fixed number of segments. On the basis of changes in model fit statistics (e.g., Akaike information criterion [AIC], Bayesian information criterion), we determined the appropriate model specification. Beginning with the probability of acquisition, we determined that one segment best characterized the data (AIC is 502 for one segment and 508 for two segments). Thus, we argue that the additional sources of variance in the acquisition likelihood that are captured by firmographic variables explain the negligible unobserved heterogeneity. Table 2 shows the likelihoods and AIC statistics for one and two segments.

After assessing the level of unobserved heterogeneity in the preselected sample, we estimated the duration model, followed by the cumulative profitability model. At each phase of the estimation, we considered the possibility that there could be multiple segments in the population. However, the statistics in Table 2 indicate that there is little unobserved heterogeneity. This outcome suggests that the response profiles are likely to be similar for customers who

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tion bias due to nonacquired prospects. Thereby, Equation 3 will become part of the system.

TABLE 2
Model Selection Accounting for Unobserved Heterogeneity

Probit Acquisition Model	
Sample size	12,024
1 Segment Solution	
Log-likelihood	–704 16
AIC	502
2 Segment Solution	
Log-likelihood	–703 98
AIC	508
Tobit Duration Model	
Sample size	2908
1 Segment Solution	
Log-likelihood	–73 21
AIC	093
2 Segment Solution	
Log-likelihood	–73 13
AIC	098
Tobit Lifetime Value Model	
Sample size	2908
1 Segment Solution	
Log-likelihood	–55 11
AIC	069
2 Segment Solution	
Log-likelihood	–55 05
AIC	073

purchase at approximately the same time We report the results from the model estimation in Table 3 (standardized parameter estimates)

Marginal Effects of Communication Modes

Our model yields largely consistent results regarding the association between the number of contacts through the different contact channels and the three dependent variables (acquisition, duration, and profitability) All communication modes have a positive impact on acquisition, but specifically, our model indicates that face-to-face interactions have the greatest impact ($\beta =$ 452), followed by telephone ($\beta =$ 298) and then e-mail ($\beta =$ 271) contacts

When the question is addressed of which mode of contact is most effective for increasing relationship duration, our results remain unchanged relative to the acquisition model Our model indicates that face-to-face interactions have the greatest impact ($\beta =$ 381), followed by telephone ($\beta =$ 328) and then e-mail ($\beta =$ 152) contacts

Finally, with respect to customer profitability, we find that the most interpersonal contact mode (i e , face-to-face) is the strongest driver ($\beta =$ 396) of customer profitability, followed by telephone ($\beta =$ 356) and then e-mail ($\beta =$ 255) contacts Thus, the effects are similar to acquisition and duration

Although contacts through more personalized channels have a stronger association with the three dependent variables in comparison with less personal contact channels, this finding pertains only to the number of contacts through the respective channel It is also important to note that these modes of contact are distinctive in terms of their costs The cost aspect is captured through acquisition and retention spending, which we include in the model

Interactions Between Communication Modes

With regard to contact channel interactions in this research, we find evidence of positive synergies between telephone and e-mail and face-to-face and e-mail with respect to acquisition, relationship duration, and profitability (see Table 3) The face-to-face × telephone interaction is not significant in any of the three cases This finding is important because prior research has found evidence of media synergies only at the aggregate level To compare the relative effectiveness of acquisition versus retention expenditures, it is not sufficient to consider only the parameter estimates or the marginal effects of the variables, because the way the expenditures are allocated across the communication channels will influence the effectiveness of the expenditures We therefore make this assessment in the next section by considering simultaneously how much is allocated and how the expenditures are allocated

Control Variables

The control variables that we introduced in the model are, for the most part, significant at $p <$ 05, and they show no counterintuitive signs Acquisition expenditures and retention expenditures have diminishing marginal associations with the likelihood of customer acquisition, lifetime duration, and customer profitability This finding empirically verifies Blattberg and Deighton's (1996) proposition, in which they assert that there are decreasing returns to acquisition and retention expenditures Thus, there are optimal expenditure levels that result in optimal acquisition and retention rates

A key aspect of our selection model approach is the ability to assess the impact of the acquisition stage on the later duration and profitability stages Consistent with prior research (Thomas 2001), the data reveal that the duration of a relationship is correlated with the likelihood of acquiring a customer ($\beta_\lambda =$ 299) In addition, we find a marginally significant, positive association of acquisition likelihood and profitability ($\beta_\lambda =$ 096) This important finding posits that a customer who is more likely to be acquired is also more likely to generate higher returns for the company, which underscores the importance of targeting the correct prospects as opposed to all potential prospects It also underscores the need to model the constructs in a simultaneous fashion, as is done here Of the total variance explained across the three equations, the distribution of the relative weights, on average, is approximately 25%, 27%, 23%, and 25% for the acquisition expenditure, retention

TABLE 3
Standardized Parameter Estimates

Acquistion Equation	Tests of Significance
Acquisition dollars	–.559**
Acquisition dollars²	–.012*
Contact Channel	
Firm-initiated	
Telephone	.298**
Face-to-face	.452**[a]
E-mail	.271*[a,b]
Telephone × e-mail	.086**[a,b,c]
Face-to-face × e-mail	.052**[a,b,c]
Customer-initiated	
Web	.376**
Firmographics	
Industry type	.306*
Annual revenue	.414**
Size of firm	.370**

Duration Equation	
Retention dollars	.501**
Retention dollars²	–.101*
Contact Channel	
Firm-initiated	
Telephone	.328**
Face-to-face	.381**[a]
E-mail	.152*[a,b]
Telephone × e-mail	.093**[a,b,c]
Face-to-face × e-mail	.077**[a,b,c]
Customer-initiated	
Web	.386**
Frequency	.417**
Frequency²	–.079*
Cross-buying	.288**
Share-of-wallet	.335**
Lambda	.299**

Profitability Equation	Tests of Significance
Acquisition dollars	.581**
Acquisition dollars²	–.219**
Retention dollars	.458**
Retention dollars²	–.203**
Contact Channel	
Firm-initiated	
Telephone	.356**
Face-to-face	.396**[a]
E-mail	.255*[a,b]
Telephone × e-mail	.063**[a,b,c]
Face-to-face × e-mail	.057**[a,b,c]
Customer-initiated	
Web	.301**
Frequency	.322**
Frequency²	–.074*
Estimated duration	.301**
Cross-buying	.338**
Share-of-wallet	.296**
Lambda	.096*

*$p < .10$
**$p < .05$
[a]The coefficient is significantly different (at $p < .05$) from that of the telephone contact channel.
[b]The coefficient is significantly different (at $p < .05$) from that of the face-to-face contact channel.
[c]The coefficient is significantly different (at $p < .05$) from that of the e-mail contact channel.

expenditure, firm-initiated contacts, and remaining control variables, respectively.

Resource Allocation Optimization

According to our analysis of the parameter estimates, there are several key issues that must be explored further:

1. Given budget constraints, how does the profit-maximizing strategy allocate resources between the contact modes that vary in their degree of interpersonal interaction and costs?
2. Which is more critical for profitability, acquisition or retention expenditures?
3. Does the contact strategy that maximizes customer profitability also maximize acquisition or retention rates?

To explore these issues more concretely, we performed several simulations based on the parameter estimates and the equations for acquisition, duration, and customer profitability (i.e., Equations 1–3).

The Profit-Maximizing Resource Allocation Strategy

Maximizing customer profitability for the duration of the customer–firm relationship is the goal of this simulation. In Scenario 1 (see Table 4), we determined the levels of acquisition and retention expenditures, the number of contacts in each channel, and the degree to which the channels should be used at the same time to maximize cumulative profits. In our model, the intermediate steps in this profit maximization are the estimation of (1) the λ parameter given the expenditure and contact levels and (2) the relationship duration given the expenditure and contact levels. We assume that all other variables in the model (i.e., share-of-wallet,

TABLE 4
Simulation Results

	Scenario 1		Scenario 2				Scenario 3		Scenario 4	
Objective	Maximize Customer Profitability by Optimizing Spending		Maximize Customer Profitability by Optimizing Total Contacts				Maximize Acquisition Rate by Optimizing Acquisition Contacts		Maximize Relationship Duration by Optimizing Retention Contacts	
Constraints			Spending Fixed at Means				Spending Fixed at Means		Spending Fixed at Means	
Acquisition spending	$134 55	21 1%	$508 00	25 2%			$508 00			
Retention spending	$503 77	78 9%	$1,506 00	74 8%					$1,506 00	
Total spending	$638 32		$2,014 00							
Cumulative profits	$754,087 56		$441,015 03							
Percentage change in profitability from optimal			−41 52%							
Percentage deviation in budget from optimal			215 51%	−68 31%						
Probability of acquisition	2234		2579				2996			
Expected relationship duration	1490 51		1514 76						1587 55	
Percentage change in relationship duration									4 8%	
Number of Contacts	Total Contacts	Total Effort	Total Contacts	Total Effort	Acquisition Effort	Retention Effort	Acquisition Contacts	Acquisition Effort	Retention Contacts	Retention Effort
Telephone	4 38	11 0%	27 80	43 9%	50 9%	42 1%	4 05	24 9%	21 37	41 5%
Face-to-face	60	1 5%	87	1 4%	3%	1 6%	50	3 1%	1 54	3 0%
Web	2 80	7 1%	2 80	4 4%	3 7%	4 6%	60	3 7%	2 33	4 5%
E-mail	31 90	80 4%	31 90	50 3%	45 1%	51 6%	11 10	68 3%	26 20	50 9%
Telephone × e-mail	1 60		1 60				1 40		1 29	
Face-to-face × e-mail	40		40				04		39	
Total contacts	39 68		63 37				16 25		51 44	

Notes All numbers are per customer

cross-buying, frequency, and firmographics) are at their mean

To be consistent with the model variables, it is important for this analysis (and all other scenarios) that the expenditures are directly linked to the number and type of contacts Thus, in each simulation, the total expenditure (acquisition plus retention) equals the total cost of contacting the customer through the various modes of communication This necessary condition still allows the allocation across channels to be different for the same levels of expenditure

As a comparison to Scenario 1, we simulated Scenario 2, in which we maximized customer profitability but allowed the number of contacts in each channel and the degree of simultaneous usage to vary In Scenario 2, the expenditures and all the other variables are fixed at their means We present the results for the two scenarios in Table 4

Scenario 1 shows that the profit-maximizing strategy for the firm is to invest 78 9% of its budget in retention and 21 1% in acquisition This allocation is slightly different from the firm's current mean allocation of 74 8% for retention and 25 2% for acquisition (Scenario 2) However, the dramatic difference between the profit-maximizing solution (Scenario 1) and the mean level of spending (Scenario 2) is in the amount spent Specifically, the analysis shows that, assuming an optimal allocation of contacts across channels in both scenarios, a 68 31% decrease in spending from the mean level increases the cumulative profitability of a customer by 41 52% Thus, currently the firm is overspending on its customers This overspending apparently increases the customer acquisition rate (2234 in Scenario 1 versus 2579 in Scenario 2) and the expected relationship duration (1490 days in Scenario 1 versus 1514 days in Scenario 2) However, the long-term profitability of a customer is declining, which suggests that overspending can result in inefficient resource allocation and, more important, a negative return on investment (ROI) We provide a more detailed discussion of ROI subsequently From a measurement perspective, this result supports the claim that firms should not use a single measure to assess their performance Measuring acquisition rates, retention rates, and long-term profitability is important for understanding customer behavior and for accurately identifying potential problems in the firm's customer management practices

In terms of the effort allocation and number of contacts, the profit-maximizing solution (Scenario 1) suggests that the dominant form of communication should be e-mail (80 4% of the total effort) Telephone communication is the second most impactful contact and should receive 11 0% of the total effort allocation From the parameter estimates alone, this finding may appear erroneous because e-mail communications are the least effective in terms of acquisition, duration, and profitability A rationale for this effect may be that budget constraints, a reality for almost all firms, factor into the simulation but are not taken into account when the parameters are determined from the estimation In the simulation, we allow expenditures and/or the number of contacts to vary within the range of the data used to estimate the model With budget constraints and in these conditions, cost effectiveness, not just efficiency, must be a consideration and compared across alternatives

From the cost effectiveness considerations of the e-mail communication channel, an obvious question that arises is, To what extent should e-mail be used in conjunction with other modes of communication? We address this question in our analysis through the interaction terms The interaction terms measure the number of times that any two communication modes should occur in the same month but do not represent an increase in the total number of communication contacts Thus, in the optimal scenario, we find that when telephone communications are used, an e-mail should accompany it during that same period on 1 6 occasions In other words, 37% of the telephone contacts should be accompanied by an e-mail With regard to face-to-face communication, the optimal scenario is to accompany the face-to-face interaction with an e-mail interaction in the same period 67% of the time

Although the firm cannot control the degree of customer-initiated interactions, it can create opportunities to encourage such communications, and the Web is a tool for doing that The simulation suggests that 7 1% of the firm's resources should be directed toward communicating with customers through the Web channel

As a contrast to the profit-maximizing effort and expenditure allocation (Scenario 3), we also examine the profit-maximizing communication strategy given a mean level of expenditures (Scenario 2) At the mean level of expenditure, which is higher, the profit-maximizing contact strategy is to increase the total number of contacts by nearly 60% (from 40 to 63) The distribution of the contacts is split more evenly, with 50 3% directed toward e-mail communication and 43 9% directed toward telephone communication Compared with the e-mail and telephone channels, the emphasis on Web and face-to-face channels is minimal

Comparing the differences in budget and channel emphasis across Scenarios 1 and 2, we conclude that overspending tends to lead to greater investments in more costly and interpersonal communications that do not pay off in terms of customer profitability Firms can use this key practical insight when faced with the need for cutbacks on expenditures

Which Is More Critical: Acquisition Expenditures or Retention Expenditures?

The goal of this analysis is to demonstrate the impact of not optimizing acquisition expenditures versus not optimizing retention expenditures To demonstrate this impact, we focus on customer profitability We predict profits using unstandardized estimates and the model represented by Equations 1–3 As in the previous part of the simulation, before predicting profits, we estimate and use the lambda and relationship duration in the profit prediction, and we fix all other necessary but nonrelevant variables at their means

To mimic the economic environment in which firms reevaluate their budgets, we allow the expenditure change to be either 10% or 25% and be driven by a change in either the acquisition or the retention budgets In Table 5, we show how the per-customer profitability changes at different expenditure levels For reference, in Table 6 we report the total expenditure change as acquisition and retention expen-

TABLE 5
Long-Term Customer Profit Predictions (Percentage Change from Optimal Profits)

	Retention Expenditures					
	.75 × Optimal	.9 × Optimal	Optimal	1.1 × Optimal	1 25 × Optimal	
Acquisition Expenditures						
75 × optimal	$698,676 (–7.35%)	$752,459 (– 22%)	$752,859 (– 16%)	$752,459 (– 22%)	$750,359 (–.49%)	**Diagonal 1**
9 × optimal	$727,163 (–3 57%)	$753,491 (– 08%)	$753,891 (– 03%)	$753,491 (–.08%)	$751,392 (– 36%)	
Optimal	$726,273 (–3 69%)	$753,688 (– 05%)	$754,088	$753,688 (– 05%)	$752,588 (– 33%)	
1 1 × optimal	$736,623 (–2 32%)	$753,491 (–.08%)	$753,891 (– 03%)	$753,491 (–.08%)	$751,391 (– 36%)	
1 25 × optimal	$750,358 (–.49%)	$752,458 (– 22%)	$752,858 (– 16%)	$752,458 (– 22%)	$750,358 (– 49%)	**Diagonal 2**

Notes Predictions assume an optimal communication allocation All numbers are per customer

TABLE 6
Percentage Change in Total Budget from Optimal Total Budget

	Retention Expenditures					
	.75 × Optimal	.9 × Optimal	Optimal	1.1 × Optimal	1.25 × Optimal	
Acquisition Expenditures						
75 × optimal	–25.00%	–13 16%	–5 27%	2 62%	14.46%	**Diagonal 1**
9 × optimal	–21 84%	–10.00%	–2 11%	5.78%	17 62%	
Optimal	–19 73%	–7 89%	.00%	7 89%	19 73%	
1 1 × optimal	–17 62%	–5.78%	2 11%	10.00%	21 84%	
1 25 × optimal	–14.46%	–2 62%	5 27%	13 16%	25 00%	**Diagonal 2**

diture deviations from their optimal levels[6] When interpreting Table 5, it is important to recall that acquisition and retention expenditures represent different proportions of the total budget (Table 4) Thus, a 10% deviation in the acquisition budget (which is a significantly smaller portion of the total budget) from its optimal level represents only a 2 11% deviation from the optimal total budget

The profit projection in Table 5 shows that the percentage changes in profit are small, particularly at the level of a 10% change in the total budget This projection suggests that relatively substantial deviations from optimal expenditures are associated with relatively modest changes in the dependent variable (i e , a flat maximum) However, despite the modest percentage changes in profits for a single customer, on an absolute basis and for multiple customers, the loss in profitability is significant For example, the smallest difference occurs when the acquisition budget is 90 of the optimal and the retention budget is optimal[7] At this expenditure level, a firm with a portfolio of 200,000 customers[8] will save approximately $2 69 million from reduced marketing expenditures but lose approximately $39 3 million in long-term customer profitability because of suboptimal budget allocations These figures only become more magnified as the budgets deviate further from the optimal level

There are several important insights regarding the ROI when budgets deviate from the optimal level To compute the ROI, we use the approach described by Rust, Lemon, and Zeithaml (2004), which focuses on the size of the investment and the change in customer equity that results from the investment In this context, we measure the change in customer equity as the deviation in the long-term profitability from the optimal level Thus, the change in customer equity and the resultant ROI calculations are negative We report the exact numbers in Table 7 The first insight from the ROI analysis pertains to acquisition spending

Acquisition Spending Under the assumption that retention spending is optimal and contacts are optimally allocated, the misallocation (i e , deviation from the optimal acquisition expenditure) is asymmetric, underspending on acquisition is worse than overspending on acquisition by the same amount For example, overspending the optimal acquisition budget by 25% results in an ROI of –2 83, whereas underspending by 25% results in an ROI of –3 03 A similar insight can be drawn from retention spending

Retention Spending Under the assumption that acquisition spending is optimal and contacts are optimally allocated, overspending on retention is better than underspending on retention by the same amount This result is most significant at the 25% level At this level, underspending on retention results in an ROI of –55 29, whereas overspending by 25% results in an ROI of only –4 27

The results on the diagonal of Table 7 also provide insight into the acquisition/retention trade-off Specifically, the diagonals help answer the following question When faced with the need to make a budget change, how should firms make that change? In most cases, firms consider this question not as "either/or" but rather as how much to pull from or add to each budget The diagonals provide insight into this question

Diagonal 1 Diagonal 1 describes the situation in which neither the acquisition nor the retention budget is at its respective optima, and instead, one type of expenditure is increased while the other is decreased At comparable absolute total budget changes (see Table 6), the results in Table 7 show that increases in acquisition expenditures and decreases in retention expenditures (from the optimal) result in lower ROIs than do decreases in acquisition and increases in retention This important outcome is not obvious from the parameter estimates because the ROI metric we used in this analysis taps further into a firm's performance than just profitability Here, the ROI measure focuses on the incremental change in customer value and compares the size of that change for different levels of investment Thus, consistent with our prior assertion, multiple metrics are useful for assessing firm performance

Diagonal 2 The highlighted Diagonal 2 provides insight into the impact of jointly increasing or decreasing the acquisition and retention budgets At comparable absolute changes in the total budget, the results indicate that underspending decreases the ROI more than does overspending This effect becomes significantly more magnified at greater deviations from the optimal expenditure levels This result has important implications for customer portfolio management because it suggests that firms must invest sufficiently to acquire and maintain relationships Although the investment in the customer may become less efficient beyond the optimal expenditure level, the decreased efficiency does not outweigh the lost value that the firm would incur if the customer's potential was not fully realized

Does the Optimal Contact Strategy Maximize Customer Profits, Acquisition Likelihood, and Relationship Duration?

Intuitively, an optimal strategy should maximize the customer's profitability, the acquisition likelihood, and the relationship duration However, the relative magnitude of the parameter estimates across the three equations suggests that this is not the case To investigate this proposition, we vary the number of contacts and the interaction level between the contacts but fix the other variables (including expenditures) at their means Then, we use the estimates from each equation of the model to determine the number and distribution of contacts that would maximize customer profitability (Scenario 2), the probability of acquisition (Scenario 3), and the length of the customer–firm relationship (Scenario 4) We show this comparison in Table 4

In Table 4, note that the contact strategy, which maximizes customer profitability, results in a 26 probability of acquisition and a relationship duration of 1514 days In con-

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[6] In Tables 5 and 6, we round all dollar amounts to the nearest whole number and all percentages to two decimal points

[7] As a result of rounding, increasing and decreasing the acquisition budget by 10% appears to give the same result However, through our analysis, we find that reducing the budget results in profits that are slightly lower than those that result from increasing the acquisition budget by the same amount The absolute difference between a 10% increase and a 10% decrease is $ 42

[8] This number is representative of the size of this firm's customer base

TABLE 7
Effect of Marketing Expenditures on ROI

	Retention Expenditures					
	.75 × Optimal	.9 × Optimal	Optimal	1.1 × Optimal	1.25 × Optimal	
Acquisition Expenditures						
75 × optimal	−116 74	−3 94	−3 03	−3 49	−6.10	**Diagonal 1**
9 × optimal	−54 97	−2 04	−1 31	−1.88	−4 59	
Optimal	−55 29	−1 68	n/a	−1 58	−4 27	
1 1 × optimal	−34 21	−1.99	−1 30	−1 85	−4 47	
1 25 × optimal	−7 83	−3 62	−2 83	−3 26	−5.67	**Diagonal 2**

Notes n/a = not applicable

trast, the contact strategy that maximizes the acquisition likelihood results in a probability of acquisition of 30 The contact strategy that maximizes relationship duration results in a duration of 1587 days Thus, the profit-maximizing contact strategy maximizes neither acquisition likelihood nor relationship duration Because the communication budget is fixed in this scenario, it is appropriate to consider it in terms of maximization, not in terms of optimization The maximization of acquisition and retention rates results from various channel usage scenarios within the budget restriction

A reason for this outcome could be that the profit equation parameters reflect the cost effectiveness (i e , cost–benefit) of each contact mode, whereas the acquisition and duration equation parameters reflect only the effectiveness of each contact mode This distinction leads to a difference in the relative magnitude of the parameters when profit is the response objective versus when acquisition likelihood or relationship duration is the response objective Therefore, the optimal solution for acquisition or duration will not necessarily be the optimal solution for a profit objective

Another interesting finding from this analysis pertains to the strategy for allocating resources across the contact channels Note that in Scenarios 3 and 4, it is not the total number of contacts that is determined but rather the acquisition or retention contacts Thus, when we compare Scenario 2 with Scenarios 3 or 4, we consider the percentage of either the acquisition or retention effort, not the percentage of total effort

Comparison of Scenario 2 (maximizing profits) and Scenario 3 (maximizing acquisition rates) reveals a similar but reverse emphasis In both scenarios, telephone and e-mail are the dominant forms of communications Specifically, the results suggest that more than 93% of the acquisition effort should be directed toward these two channels However, when cumulative profits are the objective, telephone is more dominant than e-mail, whereas the reverse is true when acquisition is the objective In contrast to the acquisition scenario, the comparison between Scenario 2 (maximizing profits) and Scenario 4 (maximizing duration) suggests a similar optimal distribution of communications across the channels Specifically, the relative ordering of retention communication efforts across the channels is the same for cumulative profit maximization and duration maximization In combination, Scenarios 2, 3, and 4 suggest that when the goal is short term, such as customer acquisition, interpersonal interactions are not as critical However, for objectives managed over a longer time horizon (e g , cumulative profitability), interpersonal interactions aid in the achievement of the objective

In summary, this simulation addresses three general questions that a practicing manager may confront

1 If marketing budgets deviate from their optimal level, what is the impact on customer profitability (see Table 5)?
2 If managers are mandated to cut their budgets by, say, a fixed percentage, from which "bucket" should they make the cuts—acquisition, retention, or both (see Tables 5 and 6)?
3 Increasingly, marketing managers are assessed on the basis of not only their profits but also their ROI Thus, under the assumption of a suboptimal allocation of the budget, in which allocation scenario is the ROI more attractive (see Table 7)?

Conclusion

In this study, we investigated several drivers of customer profitability and derived some implications for resource allocations to customers and prospects A key assertion demonstrated in this analysis is that both the amount of investment and how it is invested in a customer relate directly to the acquisition, retention, and profitability of that customer Expanding on this basic principle, we arrive at several substantive conclusions for our empirical setting

How Much to Invest

We find that underspending is more detrimental and results in smaller ROIs than does overspending When firms trade off between expenditures for acquisition and those for retention, a suboptimal allocation of retention expenditures will have a greater impact on long-term customer profitability than will suboptimal acquisition expenditures Consistent with prior research (Chintagunta 1993, Tull et al 1986), there appears to be a flat maximum with respect to acquisition and retention expenditures Specifically, we find that a 10% deviation in either acquisition or retention expenditures from their respective optimal levels results in less than a 1% change in the long-term profitability of a customer

How to Invest

If the firm initiates the contact, the relative effectiveness of highly interpersonal and interactive communication channels is greater than that of less interpersonal and interactive communication channels However, this generalization does not hold for all response variables if the customer initiates the interaction The customer communications strategy that maximizes long-term customer profitability maximizes neither the acquisition rate nor the relationship duration Instead, developing a communications strategy to manage long-term customer profitability generally requires a long-term and holistic perspective toward the relationship This perspective tends to give more emphasis to more interpersonal and interactive communications than does a limited focus on acquisition

Each of these conclusions can be used for the strategic advantage of a firm and can have a potentially large impact on the cost and/or revenue aspect of customer profitability We acknowledge that generalizability of some of the results can be achieved only with further testing on multiple data sets[9] However, many of the conclusions would not have been revealed if our model did not integrate acquisition, retention, and customer profitability into a single framework that accounts for the natural linkages and endogeneity of the relationship dimensions, a critical contribution of our research Specifically, we present a decision framework for managing multiple dimensions of a customer–firm relationship that is based on established statistical models and econometric methods In line with much research in customer relationship management, individual customer profitability should be the objective function A key conclusion of this research is that firms can manage their customer base profitably, but it requires resource allocation decisions that involve trade-offs

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[9] We also estimated the model presented in this research on a data set for a B-to-C firm that used similar customer contact modes Although this empirical context was not as rich, the effects that are of focal interest (decreasing returns to acquisition and retention, flat maximum, asymmetric response to acquisition, and retention spending changes) were consistent with our original findings

Limitations and Suggestions for Further Research

Despite the usefulness of this decision-modeling framework, we realize that it has certain limitations For example, a competitor's action may have an impact on the focal firm's customer behavior However, because we lack more specific data, in this research we account for competition by including only a customer's share-of-wallet with the focal firm

Another caveat of this research is our ability to separate marketing expenditures between customer acquisition and retention This separation is more straightforward in a B-to-B context but can become quite complex in B-to-C settings and when mass communications are a major part of the marketing expenditure

Finally, to arrive at empirical generalizations, additional research should investigate the relationships between the key constructs in other industries and with regard to other resource decisions The key limiting factor seems to be the availability of appropriate data that enable these kinds of tests However, this research has taken a first step toward a more complete understanding of the drivers of customer profitability by using a database that tracks information from before acquisition to termination by the customer or to the right-censoring period

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Douglas W. Vorhies & Neil A. Morgan

Benchmarking Marketing Capabilities for Sustainable Competitive Advantage

Market-based organizational learning has been identified as an important source of sustainable competitive advantage One particular learning mechanism, benchmarking, is a widely used management tool that has been recognized as appropriate for identifying and enhancing valuable marketing capabilities However, despite widespread admonitions to managers, the benchmarking of marketing capabilities as a route to sustainable competitive advantage has received scant empirical attention The authors empirically examine the potential business performance benefits available from benchmarking the marketing capabilities of top-performing firms The results suggest that benchmarking has the potential to become a key learning mechanism for identifying, building, and enhancing marketing capabilities to deliver sustainable competitive advantage

Market-based learning has been recognized as an important source of sustainable competitive advantage (e g , Hult 1998, Slater and Narver 1995) A widely adopted market-based learning approach is benchmarking, a structured process by which a firm seeks to identify and replicate "best practices" to enhance its business performance (Camp 1995, Zairi 1998) One of the most popular management tools in the world, benchmarking has become a primary instrument in firms' total quality management, knowledge management, and process improvement efforts (e g , Anderson 1999, Garvin 1993, Rigby 2001) It has also been recommended as a marketing capability improvement tool (e g , Brownlie 2000, Day 1994, Dickson 1992, Woodburn 1999), with firms having undertaken benchmarking projects in areas such as customer satisfaction monitoring and brand management (e g , Andriopoulos and Gotsi 2000, Hiebeler, Kelly, and Ketteman 1998) Yet despite the popularity of benchmarking and the theoretical importance of market-based learning, there is almost no empirical evidence either to support admonitions to benchmark marketing capabilities as a route to sustainable competitive advantage or to guide managers' benchmarking efforts if they follow this advice (e g , Ettlie and Johnson 1994)

This article addresses three important gaps in knowledge regarding the benchmarking of marketing capabilities First, we examine the key normative benchmarking theory premise that marketing capabilities associated with superior firm performance can be identified and that the marketing capability gap between a firm and top-performing benchmarks explains significant variance in business performance This provides the first calibration of the performance benefits potentially available through benchmarking marketing capabilities Second, we present the first empirical assessment of important benchmarking process design questions regarding what the appropriate number of benchmark sites is, whether to search for benchmark sites within or across industries, which marketing capabilities may be appropriate for benchmarking, and how they should be examined Third, we demonstrate how profile deviation can be used as a sophisticated and robust tool for benchmarking marketing capabilities, and we extend this method by using models that incorporate weightings and interdependence among capabilities and sensitivity analyses using multiple different benchmark profiles We also provide practical guidance for managers regarding how to implement benchmarking processes to identify and improve marketing capabilities as a route to sustainable competitive advantage

We begin by describing benchmarking and the theoretical rationale linking it with sustainable competitive advantage Next, we identify and develop indicators of relevant marketing capabilities We then describe our data collection and measures and examine the relationship between marketing capabilities and business performance Using profile deviation analysis to operationalize key stages of the benchmarking process, we then identify top-performing firms and calibrate their marketing capability profiles as benchmarks Next, we assess the business performance impact of deviation from these benchmarks and the effect of weighted versus unweighted marketing capability models, different numbers of benchmark firms, and benchmarks from the same industry versus across industries on this relationship Finally, we discuss the implications and limitations of our study and identify important areas for further research

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Douglas W Vorhies is Assistant Professor of Marketing, School of Business Administration, University of Mississippi (e-mail dvorhies@bus olemiss edu) Neil A Morgan is Assistant Professor of Marketing, Kenan-Flagler Business School, University of North Carolina, Chapel Hill (e-mail Neil_Morgan@unc edu) The authors gratefully acknowledge insightful comments and suggestions in the development of this article from William D Perreault Jr and Paul Root

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Research Framework

Benchmarking is a market-based learning process by which a firm seeks to identify best practices that produce superior results in other firms and to replicate these to enhance its own competitive advantage (Camp 1995, Mittelstaedt 1992) Over time, the primary focus of benchmarking has moved from the content of the product or services produced, the strategy pursued, and performance outcomes achieved by top-performing firms to a process focus on the capabilities believed to have produced the superior performance outcomes observed (e g , Anderson 1999, Ralston, Wright, and Kumar 2001) Although this process/content dichotomy is widely used in the literature, in practice benchmarking organizational capabilities involves both content and process issues (e g , Fawcett and Cooper 2001, Zairi 1998) Benchmarking organizational capabilities is a structured learning process comprising (1) a search stage in which managers search for firms exhibiting superior performance and identify the capability drivers of observed performance superiority, (2) a gap-assessment stage in which the capability differences between the firm and the benchmark sites are assessed, and (3) a capability improvement stage in which the firm plans and executes gap-closing capability improvements (e g , Camp 1995, Garvin 1993)

Three major theoretical perspectives support normative suggestions that benchmarking marketing capabilities can provide a source of sustainable competitive advantage First, resource-based view (RBV) theory identifies heterogeneity in the levels, value, inimitability, and nonsubstitutability of firms' resources and capabilities as the fundamental cause of interfirm performance variations (Amit and Shoemaker 1993, Barney 1991, Wernerfelt 1984) To the extent that benchmarking can enable a firm to enhance the level and value of its stock of marketing capabilities, it should therefore lead to competitive advantage (Teece, Pisano, and Shuen 1997) Furthermore, to the extent that benchmarking as a continuous higher-order learning capability is itself valuable, inimitable, and nonsubstitutable, benchmarking-based improvements in a firm's stock of marketing capabilities can be sustained (Dickson 1992)

Second, strategic marketing scholars have identified a firm's market orientation—its ability to learn about its market environment and to use this knowledge to guide its actions appropriately—as a key driver of business performance (e g , Hunt and Morgan 1995, Jaworski and Kohli 1993, Narver and Slater 1990) Market orientation researchers have specified benchmarking as an important market-based learning tool that can enable firms to build and deploy resources and capabilities in ways that are appropriate for their market environment (Slater and Narver 1995) The literature indicates that benchmarking provides an operational mechanism for directing manager and employee attention to the external market environment (e g , Hiebeler, Kelly, and Ketteman 1998, Teece, Pisano, and Shuen 1997), for reaching a shared interpretation of the capabilities required to achieve superior performance (e g , Camp 1995, Zairi 1998), and for appropriately directing investments in capability improvement (e g , Brockett et al 2001, Camp 1989) Therefore, market orientation researchers have posited benchmarking as a learning tool that can help create market-driven firms (Day 1994, Slater and Narver 1995)

Third, organizational learning theory indicates that for market-based learning to form a source of sustainable competitive advantage, a firm's market surveillance must be more alert, timely, and accurate than that of its rivals (e g , Dickson 1992, Teece, Pisano, and Shuen 1997) Benchmarking has been identified as a structured and continuous process that helps reduce perceptual bias (e g , Dickson 1992), core rigidity (e g , Leonard-Barton 1995), and satisficing problems (e g , Winter 2000) that constrain a firm's motivation and ability to learn from market surveillance (e g , Levinthal and Myatt 1994) The literature also posits that organizational learning may be accomplished by both imitation and experimentation (e g , March 1991) Benchmarking has been identified as an important mechanism for imitative learning (Mittelstaedt 1992, Voss, Ahlstrom, and Blackmon 1997) However, the effect of different organizational and capability contexts on imitative capability improvement efforts inevitably results in the creation of a unique stock of capabilities in the benchmarking firm (Collis 1994, Grant 1996) Therefore, benchmarking also provides an important opportunity for learning by experimentation (Dickson 1992, Haunschild and Miner 1997)

Despite this theoretical support, the benchmarking literature makes important normative theory assumptions and poses many benchmarking process design implementation questions to which little or no empirical attention has been paid We focus on theoretical assumptions and process design questions associated with the search and gap-assessment stages of benchmarking for three reasons First, unless the assumptions underpinning normative benchmarking theory can be validated in the first two stages, deploying resources on the final capability improvement stage of benchmarking is likely to be unproductive Second, ceteris paribus, firms that successfully accomplish the search and gap-assessment stages will have an advantage over rivals in the alertness, accuracy, speed, and efficiency of their benchmarking efforts (e g , Dickson 1992) Third, the market-based identification and monitoring of valuable sources of competitive advantage such as marketing capabilities can provide fact-based evidence to help managers recognize the need for capability improvements (e g , Day and Wensley 1988) The search and gap-assessment stages of benchmarking marketing capabilities are also required to select the most appropriate benchmarks, calibrate the potential value of alternative capability improvements options, and trigger the appropriate detailed investigations of the benchmark site required to plan and execute capability improvement actions (Camp 1995, Day 1994) Therefore, the first two stages of benchmarking both constitute a source of competitive advantage in their own right and are required for the success of the final capability improvement stage

In assessing these stages of the benchmarking process, we first examine the theoretical assumption that distinct marketing capabilities can be identified and linked with superior business performance We then examine four important but unresolved questions regarding how benchmarking marketing capabilities should be accomplished (1) Do valuable interdependencies exist that require benchmarking the entire set of marketing capabilities associated with superior performance? (2) If they do, can individual marketing capabilities be treated as equally important in assessing capability gaps? (3) Should firms search for benchmarks across industries or only in their own industries? and (4) What is an appropriate number of top-performing firms that should be used as benchmark sites?

Empirically Assessing Marketing Capability Benchmarking

Identifying Marketing Capabilities for Benchmarking

The search stage of process benchmarking involves identifying the capabilities contributing to superior performance that should be isolated for further study (Camp 1989) Because the notion of benchmarking marketing capabilities is relatively new, relevant marketing capabilities have yet to be comprehensively catalogued (e g , Menon et al 1999, Moorman and Slotegraaf 1999) As a starting point, however, the literature identifies specific capabilities used to transform resources into valuable outputs based on the classic marketing mix (e g , Day 1994, Vorhies and Morgan 2003) and the capabilities used to orchestrate marketing-mix capabilities and their resource inputs involving market information management and marketing strategy development and execution (e g , Capron and Hulland 1999, Day 1994, Morgan et al 2003) To gain insights into relevant marketing capabilities in practice, we conducted in-depth field interviews with 30 managers involved in senior marketing roles in a wide range of firms This was supplemented with four focus groups, three involving 24 marketing managers from different firms and one involving the 9 managers on the senior marketing management team of a major division of a *Fortune*-500 high-technology company We used open-ended questions, asking these 63 managers to identify and describe the marketing capabilities of their firms that they believed contributed most to creating value for customers and for the firm

Synthesizing insights from our fieldwork with those m the literature, we identified eight distinct marketing capabilities that are viewed as contributing to business performance and therefore suitable for benchmarking [1] (1) product development, the processes by which firms develop and manage product and service offerings (e g , Dutta, Narasimhan, and Rajiv 1999), (2) pricing, the ability to extract the optimal revenue from the firm's customers (e g , Dutta, Zbaracki, and Bergen 2003), (3) channel management, the firm's ability to establish and maintain channels of distribution that effectively and efficiently deliver value to end-user customers (e g , Weitz and Jap 1995), (4) marketing communications, the firm's ability to manage customer value perceptions (e g , McKee et al 1992), (5) selling, the processes by which the firm acquires customer orders (e g , Shapiro, Slywotzky, and Doyle 1997), (6) market information management, the processes by which firms learn about their markets and use market knowledge (Day 1994, Menon and Varadarajan 1992), (7) marketing planning, the firm's ability to conceive marketing strategies that optimize the match between the firm's resources and its marketplace (Morgan et al 2003), and (8) marketing implementation, the processes by which intended marketing strategy is transformed into realized resource deployments (e g , Noble and Mokwa 1999)

Linking Marketing Capabilities and Business Performance

Normative benchmarking theory assumes that managers not only can isolate distinct marketing capabilities they believe to be valuable but also can empirically link these capabilities with superior business performance In doing so, the literature highlights two key benchmarking search process design alternatives functional benchmarking, in which individual capabilities are assessed separately, and integrative benchmarking, in which a set of related capabilities is assessed collectively (e g , Fawcett and Cooper 2001) The theoretical literature indicates that interdependencies between individual capabilities often exist and can be a valuable source of competitive advantage (e g , Srivastava, Shervani, and Fahey 1999, Teece, Pisano, and Shuen 1997) Empirically, the extent to which such valuable interdependencies exist between marketing capabilities should determine whether marketing capabilities require functional or integrative benchmarking process designs

In the absence of relevant secondary data sources, we collected primary data on the eight marketing capabilities identified and firm performance through a mail survey of the top marketing executives of 748 U S firms in six industry types consumer durables, consumer nondurables, consumer services, business durables, business nondurables, and business services Within each of these industry types, we randomly selected two three-digit Standard Industrial Classification codes The 12 industries in the sample were audio and video appliances, household appliances, canned and frozen foods, soaps and toiletries, insurance, hospitals, process equipment, machine tools and patterns, chemicals, gases, and pigments, packaging, trucking, and business software services We generated a mailing list of firms in each industry from business directories and mailed a survey packet to the top marketing executive at each firm In all, 230 usable surveys were returned, representing a 31% response rate

We assessed the eight marketing capabilities using new multi-item measures developed by means of insights from our fieldwork and the literature (for item sets, see the Appendix) We had pretested and modified these measures through two smaller-scale surveys before using them in this project We measured business performance through respondents' subjective assessments of their customers' satisfaction, using a synthesis of previous measures (e g , Fornell et al 1996), profitability, using perceptual scales related to performance over the past 12 months and expectations for the following year (e g , Morgan, Clark, and Gooner 2002), and market effectiveness, using a scale that tapped the degree to which the firms' market-based goals had been achieved (e.g., Vorhies and Morgan 2003). In addition, for a subset of 109 respondent firms, we were able to collect the objective data necessary to calculate return on assets (ROA) from secondary sources. To minimize the impact of any short-term unobserved events and to allow for lagged effects, we calculated the average ROA for the two-year period immediately following our primary data collection (e.g., Boulding, Lee, and Staelin 1994). Finally, we also collected data using Jaworski and Kohli's (1993) scales to control for the environmental effects of competitive intensity, market dynamism, and technological turbulence on firm performance (e.g., Menon et al. 1999).

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[1] We do not suggest that these are the only marketing capabilities worth benchmarking—merely that these capabilities are both easily distinguished and identifiable by managers and have support in the literature as being potentially valuable determinants of business performance

We assessed the measurement properties of the constructs using confirmatory factor analyses (CFAs). To ensure acceptable parameter estimate-to-observation ratios, we divided the measures into three subsets of theoretically related variables (e.g., Bentler and Chou 1987). The measurement models fit well with the data as indicated by the CFA results for the eight marketing capability constructs ($\chi^2 = 761.91$, 499 degrees of freedom [d.f.], $p < .001$, comparative fit index [CFI] = .942, root mean square error of approximation [RMSEA] = .048), the four performance constructs ($\chi^2 = 142.19$, 94 d.f., $p < .001$, CFI = .990, RMSEA = .051), and the three environmental constructs ($\chi^2 = 63.91$, 55 d.f., $p < .02$, CFI = .982, RMSEA = .049). We also conducted additional pairwise discriminant validity assessments by comparing CFA models in which we allowed the covariance coefficient between each possible pair of constructs to vary and then fixed it at one (Anderson and Gerbing 1988; Bagozzi and Phillips 1982). Changes in χ^2 were large in each case, suggesting discriminant validity in each model. Reliability analyses (Table 1) produced Cronbach's alpha values ranging from .80 to .91 for the marketing capability measures, .89 to .95 for the business performance measures, and .71 to .91 for the environmental control measures. Overall, we conclude that our measures demonstrate good measurement properties.

Tests revealed no significant differences between first-wave (early) and second-wave (late) respondents on any of the constructs, indicating that nonresponse bias is unlikely to be present in the data (Armstrong and Overton 1977). To assess whether our results are likely to be significantly affected by common method bias, we used the objective ROA data from secondary sources to validate all analyses using the perceptual measures from the primary survey data and obtained similar results. In addition, Harmon's single-factor *post hoc* test for common methods variance indicated no "same-source" factor in our data.[2] Therefore, there are no indications of common method problems in our data.

Using full-information structural equation modeling (SEM), which estimates the loading from each indicant to the latent construct, we simultaneously examined (1) the benchmarking premise that the marketing capabilities we identified are linked with business performance and (2) the benchmarking process design question whether valuable interdependencies among these capabilities exist that would require that they be benchmarked as an integrated set. We estimated the eight individual marketing capabilities as first-order constructs using the relevant indicants from our survey data and estimated marketing capability interdependence as a second-order construct capturing the covariance among the eight marketing capabilities. Likewise, we estimated overall firm performance as a second-order factor comprising the three first-order latent performance factors (customer satisfaction, market effectiveness, and profitability) that we estimated using the relevant indicants from our survey data (e.g., Venkatraman 1990).

As we show in Figure 1, each marketing capability is positively and directly related to firm performance, indicating that these marketing capabilities are sources of competitive advantage and are therefore appropriate targets for benchmarking. The data also support the second-order factor representing interdependence among the eight marketing capabilities, and we find that this marketing capability interdependency factor is strongly and positively linked with firm performance. Furthermore, the indirect paths linking each marketing capability with firm performance by way of marketing capability interdependence are stronger than the direct paths from each marketing capability to firm performance. This indicates that in designing benchmarking processes for the firms in our sample, these marketing capabilities should be benchmarked as a set.

The Potential Business Performance Impact of Different Benchmarking Approaches

Having identified a set of marketing capabilities that are appropriate for benchmarking, we now turn our attention to calibrating the potential performance benefits of successfully benchmarking these marketing capabilities. In addition, we consider the impact of different benchmarking process design alternatives for searching for benchmarks within or across industries and the impact of the number of benchmark sites used in conducting capability gap assessments. The literature suggests that these process design alternatives contribute to important trade-offs in benchmarking efficiency and effectiveness. For example, for efficiency reasons some analysts advocate limiting the total number of firms included in the benchmark search, focusing only on industries closely related to that of the benchmarking firm, and minimizing the number of high-performing benchmark sites used in capability gap assessments (e.g., Spendolini, Friedel, and Workman 1999). However, given the relatively small number of major firms in many industries and the mimetic isomorphism among them, other analysts argue that limiting benchmarking searches to the firm's own industry reduces benchmarking effectiveness (Camp 1989). To maximize the probability of correctly identifying a firm exhibiting superior performance and to enhance the likelihood of gaining generative rather than adaptive insights, benchmarking analysts advocate searching for larger numbers of top-performing benchmarks across industries (Benner and Tushman 2002; Camp 1995).

We assess the potential business performance impact of benchmarking marketing capabilities and the effect of these

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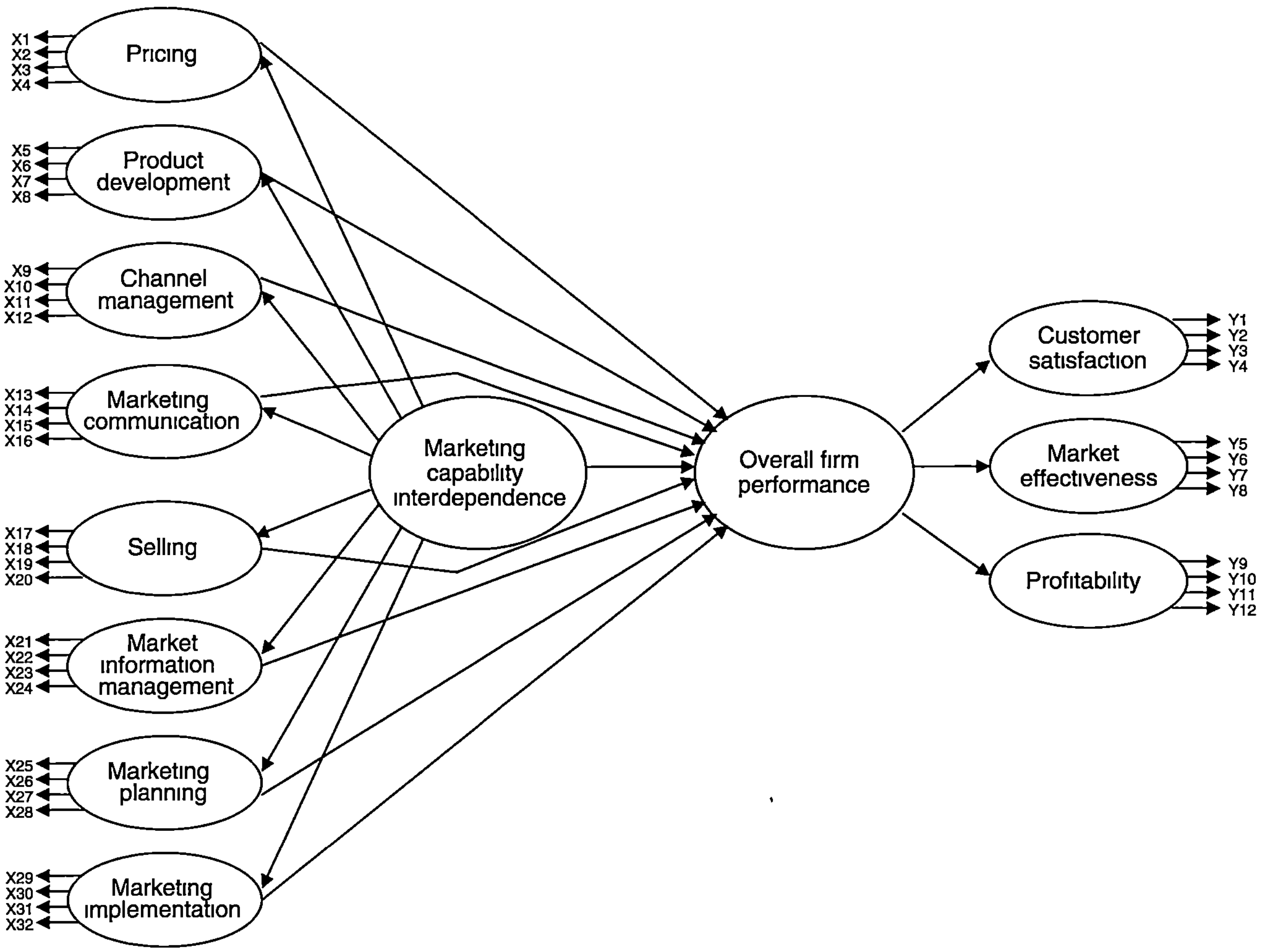
[2] Comparison of a single-factor confirmatory model (CFI = .42, RMSEA = .11) with a 14-factor confirmatory model (CFI = .92, RMSEA = .04) yields a χ^2 difference equal to 3885.81, 91 d.f., $p < .001$.

TABLE 1
Construct Means, Alphas, and Correlations

	Mean (S.D.)	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
X1 Product development capabilities	4 74 (1 13)	**.80**															
X2 Pricing capabilities	4 72 (84)	29***	**.83**														
X3 Channel management capabilities	4 89 (1 21)	31***	29***	**.90**													
X4 Marketing communication capabilities	4 25 (1 15)	37***	18**	25***	**.84**												
X5 Selling capabilities	4 71 (1 09)	38***	42***	52***	35***	**.90**											
X6 Market information management capabilities	4 47 (1 14)	55***	40***	38***	54***	49***	**86**										
X7 Marketing planning capabilities	4 56 (1 16)	46***	36***	37***	63***	63***	38***	**.91**									
X8 Marketing implementation capabilities	4 61 (1 15)	45***	40***	40***	41***	57***	56***	68***	**.91**								
X9 Profitability	4 86 (1 29)	31***	07	26***	11*	39***	26***	43***	37***	**.95**							
X10 Customer satisfaction	5 45 (1 06)	41***	04	37***	20***	42***	37***	38***	47***	38***	**.91**						
X11 Market effectiveness	5 15 (1 11)	34***	06	32***	19***	37***	32***	37***	32***	58***	49***	**89**					
X12 ROA	09 (17)	25***	23**	14	04	14	25***	23**	21**	35***	20**	22**	N/A				
X13 Firm size	391 (2045)	01	– 05	– 07	08	– 07	04	02	– 03	– 08	– 16**	– 10	– 10	N/A			
X14 Competitive intensity	4 22 (1 36)	– 08	15**	12*	– 10	10	– 07	– 01	04	01	– 01	– 01	23**	– 04	**.83**		
X15 Market dynamism	3 76 (1 19)	06	01	06	– 08	– 04	– 07	02	05	07	04	06	17*	– 14**	21***	**71**	
X16 Technological turbulence	4 63 (1 51)	02	– 11	– 03	02	– 16**	01	04	– 04	12*	03	07	– 01	– 02	– 15**	30***	**.91**

*p < 10
**p < 05
***p < 01
Notes Alphas are shown in bold on the correlation matrix diagonal S D = standard deviation, N/A = not applicable

FIGURE 1
Second-Order SEM and Results



Paths modeled			Coefficient	t-Value
Product development	→	Overall firm performance	27	2 55
Pricing	→	Overall firm performance	33	3 50
Channel management	→	Overall firm performance	23	2 76
Marketing communications	→	Overall firm performance	34	3 18
Selling	→	Overall firm performance	35	2 80
Market information management	→	Overall firm performance	34	1 71
Marketing planning	→	Overall firm performance	43	2 87
Marketing implementation	→	Overall firm performance	48	2 92
Product development	→	Capability interdependence	62	8 27
Pricing	→	Capability interdependence	51	6 52
Channel management	→	Capability interdependence	50	7 13
Marketing communications	→	Capability interdependence	72	9 37
Selling	→	Capability interdependence	73	10 64
Market information management	→	Capability interdependence	84	10 92
Marketing planning	→	Capability interdependence	90	14 84
Marketing implementation	→	Capability interdependence	82	12 51
Market effectiveness	→	Overall firm performance	78	8 33
Profitability	→	Overall firm performance	68	7 93
Customer satisfaction	→	Overall firm performance	67	7 34
Capability interdependence	→	Overall firm performance	67	7 41

Model fit χ^2 = 1559 56, 969 d f , $p <$ 001, CFI = 914, RMSEA = 052 benchmarking process design alternatives using profile deviation analysis Profile deviation analysis involves identifying top-performing firms, calibrating the characteristics of the firms that are believed to be important in determining their superior performance as an ideal profile, and assessing the relationship between deviation from this profile and the performance outcome of interest (e g , Drazin and Van de Ven 1985, Venkatraman 1990) Profile deviation analysis is particularly appropriate here because it is directly analogous to the search and gap-assessment stages of the benchmarking process Therefore, it not only offers a method for assessing the performance potential of benchmarking but also, as we illustrate, may be used by managers as a sophisticated and robust methodology for conducting benchmarking in practice (e g , Vorhies and Morgan 2003)

In the selection of benchmark sites, the literature indicates that firms that have superior both market and financial performance should be targeted (e g , Camp 1995, Spendolini 1992) Therefore, we selected top-performing firms in our sample to serve as benchmarks on the basis of two criteria (1) the firms needed to report the highest performance scores on both customer satisfaction and current profitability, and (2) the firms needed to be anticipating superior financial performance for the following year We found only one firm in the data set reporting the highest possible scores on all items composing the customer satisfaction, current, and anticipated profitability scales, and therefore we selected this firm as the primary benchmark site We were also able to track this benchmark firm's stock performance for the 18-month period immediately following our data collection (at which point it merged with another firm) Rising 202%, the stock price of our benchmark firm outperformed the index of the stock market on which it is listed (which rose by 36%) by a wide margin, providing confidence in our primary benchmark site selection

The next step in the benchmarking process is to determine the gap between the benchmarking firm's marketing capabilities and those in the benchmark site (e g , Camp 1995, Spendolini 1992) This requires calibrating the set of marketing capabilities of the top-performing firms as the benchmark and comparing the marketing capabilities of the remaining firms in the data set to this benchmark (e g , Gresov 1989, Venkatraman and Prescott 1990) We accomplished this by calculating the Euclidean distance from the benchmark of all other firms in the sample across the eight marketing capability dimensions (e g , Venkatraman 1990, Vorhies and Morgan 2003),[3] using the following formula

$$\text{Dist} = \sqrt{\sum_{J}^{N}\left(X_{sJ} - \overline{X}_{iJ}\right)^2},$$

where X_{sj} = the score for a firm in the study sample on the jth dimension, $\overline{X}_{ij}$ = the mean for the ideal profile along the jth dimension, and j = the number of profile dimensions (1, 2, , 8) This provides a "profile deviation" score representing the gap between the marketing capabilities of the benchmark firm and each of the remaining firms in our sample

To calibrate the potential performance impact of benchmarking these marketing capabilities, we regressed each firms' marketing capability profile deviation score onto its business performance To control for the possible effects of scale economies, industry, and environmental conditions on firm performance, we also included firm size, a dummy industry variable, and the competitive intensity, market dynamism, and technological turbulence constructs in our regression analyses (e g , Menon et al 1999) We regressed the profile deviation score for each firm, along with the control variables, in turn onto its overall firm performance, the three individual perceptual performance measures of customer satisfaction, market effectiveness, and profitability, and the objective ROA performance data (Table 2) If benchmarking marketing capabilities has the potential to significantly improve business performance, then our results should indicate that deviation from the benchmark marketing capabilities profile is negatively and significantly related to business performance (e g , Drazin and Van de Ven 1985, Venkatraman and Prescott 1990)

As we show in Table 2, the significant, negative coefficient for deviation from the benchmark marketing capability profile in explaining firms' overall performance (β = – 56, $p <$ 001) clearly indicates the potential business performance benefits of benchmarking marketing capabilities We also assessed the impact of treating each of the eight marketing capabilities as equally important by comparing the regression containing the unweighted benchmark profile deviation term with one in which each marketing capability deviation score was weighted by that marketing capability's contribution to overall business performance (calculated from the SEM results in Table 2) (Venkatraman and Prescott 1990)[4] As we show in Table 2, the regression model containing the weighted marketing capability profile deviation term performs no better than the unweighted regression model in our data

To assess the potential performance impact of firms identifying top performers and benchmarking marketing capabilities across industries rather than limiting their search to their own industries, we also separately identified the single top-performing firm for each of the six industry types in our sample using the same selection criteria described previously We then used the marketing capability profile of each top performer as the benchmark for the rest of the firms within that industry type As we show in Table 2, our regression analyses revealed a significant, negative coefficient on firms' deviation from the within-industry marketing capability benchmark profile onto their overall performance However, the smaller profile deviation term coefficient (– 47 versus – 56) and lower R^2 value (25 versus 35) indicate a greater potential performance impact of cross- rather than within-industry benchmarking of marketing capabilities

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[3] We use the averages of each firm's score on the items composing each marketing capability A comparison using item-factor coefficients indicated that the profile deviation results obtained using the simple averages are robust

[4] We are grateful to an anonymous reviewer for this suggestion

TABLE 2
Regression Results for Deviation from Single Top Performer Benchmark (N = 1)

	Cross-Industry Overall Performance (Unweighted)	Cross-Industry Overall Performance (Weighted)	Within-Industry Overall Performance (Unweighted)	Customer Satisfaction	Market Effectiveness	Profitability	Two-Year Average ROA
Deviation from benchmark	– 56**	– 56**	– 47**	– 49**	– 44**	– 44**	– 43**
Competitive intensity	– 02	– 01	– 04	– 03	– 02	– 01	– 02
Market dynamism	01	02	05	01	02	01	12
Technological turbulence	12*	13*	05	05	10	16*	– 05
Firm size (log)	– 13*	– 13*	– 18**	– 15**	– 09	– 08	– 08
Industry	01	01	03	01	– 01	– 01	12
R^2	35	34	25	27	21	22	22
F-value	19 56	19 21	11 89	13 66	9 78	10 06	4 82
Number of firms[a]	229	229	224	229	229	229	108

*$p <$ 05
**$p <$ 01
[a]Total less benchmark firm

We also assessed the impact of deviation from the cross-industry marketing capability benchmark on each performance dimension With significant, negative profile deviation coefficients ranging from – 49 to – 44 and R^2 values ranging between 21 and 27, the performance impact potential of benchmarking marketing capabilities appears to be consistent across the three dimensions of business performance Confidence in the findings is enhanced by the regression results using the objective ROA data obtained for 109 firms in our sample as the performance dependent The coefficient for the deviation term (– 43) and R^2 value (22) in the ROA regression are very much in line with the values we observed when using the perceptual indicators of business performance as dependents

To provide empirical insights regarding appropriate numbers of top-performing benchmark sites, we also examined the impact of deviation from the marketing capability profile of single- versus multiple-benchmark sites We accomplished this through a sensitivity analysis in which we gradually relaxed the selection criteria for top-performers and used breakpoints observed in the performance data to identify benchmark groups containing different numbers of top-performing firms (e g , Venkatraman 1990) For each benchmark group, we calibrated the mean value of each of the eight marketing capabilities as the benchmark marketing capability profile The regressions in Table 3 show the impact on the profitability performance dependent of using larger numbers of top-performing firms (N = 5, 8, and 16) as marketing capability benchmark sites compared with using the single top-performer benchmark (N = 1)[5] The results for the single versus top-five and top-eight performing firms are very similar in terms of R^2 (21 versus 20 versus 19) and the impact of marketing capability profile deviation (β = – 44 versus – 43 versus – 42) However, as more firms are added to the benchmark group (N = 16), overall model fit (R^2 = 16) and the impact of marketing capability profile deviation (β = – 39, p < 001) decline

For comparison purposes, we also randomly selected five firms in which the level of business performance was unknown and used these firms to calibrate a "nonbenchmark baseline" marketing capability profile (e g , Venkatraman and Prescott 1990, Vorhies and Morgan 2003) The low R^2 (03) and insignificant coefficient for deviation term in the random baseline profile regression shown in Table 3 provide additional confidence in our profile deviation results (e g , Venkatraman and Prescott 1990)

Finally, we also examined the marketing capability profiles of the top-performing firms used as the benchmarks in our study (Table 4) The single top-performing benchmark firm rated six of its eight marketing capabilities with the highest possible score (the pricing and market information management capabilities both scored six on the seven-point scale) In line with the results of our sensitivity analysis, the profiles indicate that the marketing capability mean scores tend to trend downward in a linear fashion as more firms are added to the benchmark group The rate of decline ranges from selling capabilities, which appear to decline least quickly, to marketing communications capabilities, which appear to decline the most quickly in our sample Overall, consistent with the predictions of RBV theory, each of the top-performing benchmark groups exhibit marketing capability scores that are much higher than the mean for either the sample as a whole or the random baseline group (Table 4) In addition, the high marketing capability scores for each of the benchmark groups and the general trend downward as lower-performing firms are added to the benchmark groups also provide additional confidence in the validity of the approach we used to select appropriate benchmark sites

Discussion and Implications

Our findings support the previously untested central premise of normative benchmarking theory—that marketing capabilities associated with superior business performance can be identified and that the marketing capability gap between top-performing benchmarks and other firms explains significant variance in business performance Our SEM results indicate that the eight marketing capabilities we identify are associated with business performance and are therefore appropriate for benchmarking Furthermore, the firms most closely matching the benchmark marketing capability profile in our sample significantly outperformed

TABLE 3
Profitability Regressions for Deviation from Different Top-Performing Benchmark Groups

Number of Benchmark Firms	N = 1	N = 5	N = 8	N = 16	Random Baseline[a]
Deviation from benchmark	– 44*	– 43*	– 42*	– 39*	– 11
Competitive intensity	01	– 01	01	– 01	– 02
Market dynamism	01	– 02	01	02	02
Technological turbulence	16*	17*	17*	16*	11
Firm size (log)	– 08	– 03	– 02	– 01	– 02
Industry	– 01	– 02	– 01	– 02	– 01
R^2	21	20	19	16	03
F-value	9 89*	8 93*	8 20*	6 49*	1 13
Number of firms[b]	229	225	222	214	225

*p < 01
[a]Profile of N = 5 randomly selected firms, we obtained similar results for alternative N = 8 and N = 16 random profiles
[b]Total less benchmark firms

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[5] Analyses using the other perceptual performance measures and objective ROA produced similar results

TABLE 4
Marketing Capability Profiles of Top-Performing Benchmark Groups

	Number of Firms in Top-Performing Group				Profile of Entire Sample	Random Baseline Profile
Marketing Capability Area	**N = 1**	**N = 5**	**N = 8**	**N = 16**	**N = 230**	**N = 5**
Pricing capabilities	6 00	6 25	6 13	5 78	4 72	4 90
Product development capabilities	7 00	6 15	6 16	5 95	4 75	4 30
Distribution capabilities	7 00	6 40	6 28	5 98	4 89	4 80
Marketing communication capabilities	7 00	5 40	5 03	4 95	4 25	4 65
Selling capabilities	7 00	6 52	6 40	6 04	4 71	5 12
Market information management capabilities	6 00	5 84	5 75	5 40	4 47	4 12
Marketing planning capabilities	7 00	6 45	6 06	5 84	4 56	4 25
Marketing implementation capabilities	7 00	6 15	6 09	5 83	4 61	4 63

firms that were less similar to the benchmark in customer satisfaction, market effectiveness, profitability, ROA, and overall firm performance (Table 2) Sensitivity analyses using different benchmarks and the insignificant results using a random baseline benchmark (Table 3) indicate that these relationships are robust

The significant, negative coefficients for deviation from the benchmark marketing capability profile and the variance accounted for in each of the business performance dependents in our regressions provide a calibration of the potential business performance benefits of successfully benchmarking marketing capabilities Our results indicate the value of a benchmarking process in which managers search among competitors and peers in other industries to identify the marketing capability drivers of superior performance and assess and monitor these capabilities within their own firms From a "what gets measured gets done" perspective, successfully completing these search and gap-assessment stages of the benchmarking process can help bring about successful marketing capability improvement (e g , Day 1994, Teece, Pisano, and Shuen 1997) By focusing on the capability sources of competitive advantage, rather than just observed outcomes, and using competitors and peers as referents, such benchmarking provides an important component of a comprehensive marketing control system (e g , Day and Wensley 1988, Morgan, Clark, and Gooner 2002) When this benchmarking is an ongoing process, it helps managers plan and monitor the outcomes of their capability improvement efforts and thereby aids continuous improvements in the firm's marketing capabilities (Camp 1995)

This approach to benchmarking can also enable transformative marketing capability changes By providing a continuous and structured process for directing managerial attention externally to competitors and peers and by reaching a shared interpretation of the marketing capabilities required to achieve superior performance, benchmarking can deliver important generative organizational learning insights (e g , Camp 1989, Day 1994, Slater and Narver 1995) It can also trigger and guide more detailed investigations of specific marketing capabilities in particular benchmark sites (Camp 1995) This is not purely imitative learning, because it is difficult to replicate the capabilities of a benchmark firm exactly (Dickson 1992) Furthermore, the marketing capability interdependency we identify means that even if capabilities are perfectly replicated, improvements in one marketing capability will likely have an impact on a firm's remaining capabilities Benchmarking can therefore lead to novel changes in a firm's marketing capability stock, which both enables experimentation and innovation and increases heterogeneity between firms (e g , Haunschild and Miner 1997) Therefore, it is likely to be beneficial not only for the benchmarking firm and its customers but also for the economy (Dickson 1992)

Implications for Marketing Theory

Our study has three primary implications for marketing theory First, from an RBV perspective, we provide new insights by identifying and directly measuring eight distinct marketing capabilities and linking these with business performance in a cross-industry sample More important, our results offer the first empirical support for the existence and performance impact of interdependency among individual marketing capabilities This indicates that the firms in our sample have not established superiority in only one or a small number of marketing capabilities Theoretically, such interdependency may make marketing capabilities a more inimitable resource and therefore a greater potential source of competitive advantage (Barney 1991) Interdependency among marketing capabilities also suggests that in allocating scarce capability improvement resources, managers should be careful not only to consider individual marketing capabilities as separate investment options but also to assess the implications of such investments for the firm's overall set of marketing capabilities Therefore, our findings indicate that strategic marketing theory explanations of firm performance should more explicitly consider the interdependence among multiple marketing capabilities

Second, in calibrating the significant potential business performance benefits available from successfully benchmarking marketing capabilities, our study contributes to the market orientation literature by empirically supporting propositions that market-based learning should include learning from competitors and peers (e g , Day 1994, Slater and Narver 1995) Because we benchmark the firms in our sample with the highest customer satisfaction performance, our benchmark marketing capability profiles also provide new empirical insights into the capabilities required by market-driven firms These profiles support the proposition that market-oriented firms require strong marketing capabilities (Day 1994), the profiles also reveal that strength across a range of marketing capabilities—and not just in market information management—is required to deliver superior customer satisfaction and business performance Overall, our findings indicate that benchmarking should be an important tool in managers' efforts to create market-oriented firms (Day 1994, Slater and Narver 1995)

Third, our study also contributes to the literature on organizational learning Although benchmarking has been posited as a valuable tool for market-based learning (DiBella, Nevis, and Gould 1996, Leonard-Barton 1995, Teece, Pisano, and Shuen 1997), ours is among the first studies to calibrate its potential performance benefits empirically In addition, the larger profile deviation coefficients and greater variance explained in business performance when using across-industry versus within-industry top performers as benchmarks indicate that *where* an organization learns from affects the potential value of *what* it may learn In line with Nelson and Winter's (1982) evolutionary perspective of viewing routines (the subprocesses on which capabilities are built) as the "genes" of an organization, our results suggest the intriguing possibility that learning from peers in other industries represents the potentially transformative value of "gene splicing" (Dickson 1992)

Implications for Managers

In addition to verifying the potential value of benchmarking marketing capabilities, our study reveals new insights into how managers can benchmark marketing capabilities to achieve sustainable competitive advantage First, we demonstrate how profile deviation can be used as a tool for undertaking the search and gap-assessment stages of benchmarking Profile deviation enables managers to calibrate the value potential of improving individual marketing capabilities or sets of them It is also flexible enough to allow the benchmarking of more content-focused areas, such as marketing organization design (e g , Vorhies and Morgan 2003), or hybrid content- and process-related phenomena, such as the marketing capabilities of top-performing firms in specific industries or strategy-type groups or even those of highly market-oriented firms In practice, benchmarking consortia such as those organized by the American Productivity and Quality Center and others may provide members with samples that may be suitable for using profile deviation to benchmark marketing capabilities For example, using standardized measures of various marketing processes, the United Kingdom's Chartered Institute of Marketing is developing a database of the marketing capabilities of medium-sized firms (Woodburn 1999)

Second, in benchmarking marketing capabilities in practice, our study provides new insights relevant to each of the three stages of the benchmarking process

1 *Search stage* Our benchmark marketing capability profiles support the use of customer satisfaction and profitability criteria to select top-performing firms to serve as benchmarks Our marketing capability measures also provide a starting point for benchmarking search efforts that may be useful in firms' monitoring of their capabilities compared with those of competitors and peers and with their own prior performance (Day and Wensley 1988, Morgan, Clark, and Gooner 2002) In addition, our results indicate the potential value of cross-industry benchmark searches and the use of single or small groups of top-performing firms as marketing capability benchmarks This supports the practice of benchmarking cross-industry "best in class" capabilities in single-benchmark sites such as Wal-Mart's logistics capabilities and Toyota's new product development process (e g , Camp 1995) Although these findings are specific to our sample, by using the SEM and profile deviation approaches we illustrate that managers can assess for themselves the likely impact of such benchmarking search alternatives in the context of their own industries, strategies, and capability focuses
2 *Gap-assessment stage* Profile deviation also provides a tool for measuring marketing capability gaps between the benchmark and other firms and for linking the size (deviation) and composition (capability interdependence and weighting) of the capability gap to business performance The value of marketing capability interdependence revealed in our data suggests that among the firms in our study, the eight marketing capabilities we examine should be benchmarked as a set Our results further indicate that for these firms, weighting the individual capabilities by their impact on business performance may not add much insight beyond that provided by an unweighted model However, managers using profile deviation analysis can assess for themselves the extent to which this is true for the capabilities on which they are focused and the set of firms in their benchmark search set In an example of this in practice, Touchstone Energy, guided by the insights provided in our study, is currently using profile deviation as a benchmarking tool to assess the size, composition, and performance implications of customer satisfaction monitoring capability gaps between top customer satisfaction performers and others among its more than 600 electric co-op members
3 *Capability enhancement stage* Firms often allocate scarce marketing capability improvement resources to individual capabilities that are internally perceived to be weak and benchmark firms in which this capability is believed to be strong (e g , Andriopoulos and Gotsi 2000, Woodburn 1999) In contrast, our study indicates that managers should attempt first to identify the marketing capability drivers of superior business performance and then to assess the relevant capability gap between themselves and top-performing benchmarks Assessments of the relative performance of weighted and unweighted profile deviation models can then indicate where managers should allocate their capability improvement resources For example, our results show that in our data set, firms should prioritize marketing capabilities where their current profile is the weakest relative to the benchmark in allocating their capability improvement resources

When managers have determined which capability improvements will likely yield the greatest return, the literature suggests that they should then communicate and discuss benchmarking findings within the firm to develop a common understanding, use process mapping tools to conduct more detailed investigations of the target capabilities in the benchmark sites, agree on specific capability improvement goals, develop and execute detailed capability improvement action plans, and monitor outcomes using market and cost feedback to enhance initial capability improvements further (e g , Camp 1995, Day 1994, Dickson 1992, Zairi 1998) This approach was used by IBM to improve its "market management" capability after a cross-industry benchmarking study in the early 1990s This resulted in a radically new market management process design that IBM believed was superior to those of its competitors Consistent with our capability interdependency finding, the improved market management capability had important ripple effects in changing and enhancing IBM's selling, pricing, and product management capabilities In combination, these capability improvements transformed the way IBM addressed its markets and helped create a more market-driven organization

Limitations and Research Directions

Several limitations in our study result from trade-off decisions in our research design First, guided by our fieldwork, the literature, and our SEM results, we benchmark eight specific mid-level marketing capabilities This precluded any assessment of higher-level integrative marketing capabilities such as brand management and customer relationship management that might usefully be examined by future researchers (e g , Day 1994, Grant 1996) Second, although we control for several factors in our analyses, we were unable to collect data to control for firms' other organizational capabilities (e g , research and development) As more parsimonious capability measures are developed, researchers may be better able to control for such differences among firms in further research Third, because we examine eight different marketing capabilities, our capability measures are relatively broad and use standard activity performance-level indicants Inevitably, this results in a relative lack of depth of understanding of any single marketing capability Future researchers should focus on developing more fine-grained measures of individual marketing capabilities (e g , Dutta, Narasimhan, and Rajiv 2003) and examine the potential of more novel process measurement approaches such as process mapping (e g , Day 1994, Keen 1997)

Beyond these limitations, our study indicates three important new areas for further research First, having calibrated the potential value of the search and gap-assessment stages of benchmarking, we believe that additional research is required on the capability improvement stage A particularly useful area for such research is enhancing the understanding of the specific stages of the subprocesses underlying individual marketing capabilities and illuminating how movement between these stages is successfully accomplished This may provide insights that would enable managers to diagnose better the capabilities of a benchmark site and plan detailed capability improvement actions required in their own firm A related issue arising from our findings is the potential for trade-offs between the novel capability insights that may result from benchmarking top-performing peers in other industries versus managers' ability to translate these novel insights into valuable capability improvements within the benchmarking firm The relationship between different search and gap-assessment marketing capability insights available from competitors versus peers in other industries and the resultant capability improvements and outcomes under different conditions should be a priority for further research

Second, whereas our study indicates the potential value of using competitor- or peer-focused benchmarking of marketing capabilities to enhance firms' customer satisfaction performance, Ettlie and Johnson (1994) report that in a new product context there may be trade-offs between using such competitor- or peer-focused benchmarking tools and using more directly customer-focused tools such as Quality Function Deployment Furthermore, Nilsson, Johnson, and Gustafsson (2001) report that orientations toward both satisfying employees and process management are required for firms to achieve a customer orientation and superior performance This raises the important question whether in a marketing capabilities context there are trade-offs between the competitor- or peer-focused benchmarking supported in our research and the customer- and employee-oriented approaches and tools supported in prior research If there are, what balance of customer, competitor or peer, and internal orientations is required to maximize business performance under different conditions?

Third, although our study provides insights into the benchmarking of marketing capabilities, it does not address how firms should develop, deploy, and enhance their higher-order benchmarking capability Other than Nilsson, Johnson, and Gustafsson's (2001) work on process orientation, we know little about how firms deal with these issues (DiBella, Nevis, and Gould 1996) For example, organizational learning theory indicates that the embedded learning represented in a firm's capabilities can constrain both the motivation and the ability to generate and respond to benchmarking insights (Dickson, Farris, and Verbeke 2001, Tripsas and Gavetti 2000) and that firms need to ensure that they balance their exploration knowledge development and exploitation knowledge deployment efforts (March 1991) However, we have little understanding of the types of organizational culture and benchmarking process designs that prevent marketing capability inertia and help firms balance continuous marketing process improvement with "bedding down" and routinization Similarly, although theory indicates that benchmarking is an important higher-order "learning to learn" capability, we have no empirical insights into how firms can best develop and enhance such capabilities (e g , Dickson 1992, Winter 2000)

Conclusion

Although benchmarking has been identified as a key market-based learning tool, there has been little empirical evidence either to support normative calls to benchmark marketing capabilities or to guide managers' benchmarking efforts Our findings support normative benchmarking theory, indicating that marketing capabilities associated with superior business performance can be identified and that the marketing capability gap between a firm and top-performing benchmarks explains significant variance in business performance Our study also illustrates the utility of SEM and profile deviation as benchmarking tools and offers new insights into how managers can benchmark marketing capabilities to achieve sustainable competitive advantage

APPENDIX
Marketing Capabilities and Performance Scales

Please rate your business unit relative to your major competitors in terms of its marketing capabilities in the following areas Seven-point scale running –3 ("much worse than competitors") to +3 ("much better than competitors")

Pricing	Using pricing skills and systems to respond quickly to market changes
	Knowledge of competitors' pricing tactics
	Doing an effective job of pricing products/services
	Monitoring competitors' prices and price changes
Product development	Ability to develop new products/services
	Developing new products/services to exploit R&D investment
	Test marketing of new products/services[a]
	Successfully launching new products/services
	Insuring that product/service development efforts are responsive to customer needs
Channel management	Strength of relationships with distributors
	Attracting and retaining the best distributors
	Closeness in working with distributors and retailers[a]
	Adding value to our distributors' businesses
	Providing high levels of service support to distributors
Marketing communication	Developing and executing advertising programs
	Advertising management and creative skills
	Public relations skills
	Brand image management skills and processes
	Managing corporate image and reputation
Selling	Giving salespeople the training they need to be effective
	Sales management planning and control systems
	Selling skills of salespeople
	Sales management skills
	Providing effective sales support to the sales force
Market information management	Gathering information about customers and competitors
	Using market research skills to develop effective marketing programs
	Tracking customer wants and needs
	Making full use of marketing research information
	Analyzing our market information
Marketing planning	Marketing planning skills
	Ability to effectively segment and target market
	Marketing management skills and processes
	Developing creative marketing strategies[a]
	Thoroughness of marketing planning processes
Marketing implementation	Allocating marketing resources effectively
	Organizing to deliver marketing programs effectively
	Translating marketing strategies into action
	Executing marketing strategies quickly
	Monitoring marketing performance[a]

Performance Please evaluate the performance of your business over the past year (the next twelve months) relative to your major competitors Seven-point scale running –3 ("much worse than competitors") to +3 ("much better than competitors")

Customer satisfaction	Customer satisfaction
	Delivering value to your customers
	Delivering what your customers want
	Retaining valued customers
Market effectiveness	Market share growth relative to competitors
	Growth in sales revenue
	Acquiring new customers
	Increasing sales to existing customers
Current (anticipated) profitability	Business unit profitability
	Return on investment (ROI)
	Return on sales (ROS)
	Reaching financial goals

[a] Items deleted during scale purification

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Christian Homburg & Matthias Bucerius

A Marketing Perspective on Mergers and Acquisitions: How Marketing Integration Affects Postmerger Performance

Previous research on mergers and acquisitions (M&A) has neglected marketing issues by and large In this article, the authors examine the effects of postmerger integration in marketing (extent and speed of marketing integration) on M&A performance, as mediated by integration outcomes (magnitude of cost savings and market-related performance) Results from a survey of 232 horizontal M&A show that market-related performance after the merger or acquisition has a much stronger impact on financial performance than does cost savings In addition, the authors find that the extent of integration is beneficial in terms of cost savings but detrimental in terms of market-related performance Finally, they identify variables that moderate the relationships being considered

Mergers and acquisitions (M&A) have become increasingly popular in business practice, and especially horizontal M&A (M&A that take place in the same industry, often between direct competitors) are undertaken frequently (Krishnan and Park 2002) However, there is considerable evidence that many M&A activities are unsuccessful Estimated failure rates are typically between 60 and 80% (Marks and Mirvis 2001, Tetenbaum 1999) Thus, studying factors that influence the success of M&A is a promising field for academic research

Because there is a growing recognition that "all value creation takes place after the acquisition" (Haspeslagh and Jemison 1991, p 129), the topic of postmerger integration (PMI) has received increasing attention (e g , Capron, Dussauge, and Mitchell 1998, Datta 1991, Larsson and Finkelstein 1999, Shrivastava 1986) However, marketing-related issues of PMI, such as whether and how two firms' marketing activities are integrated and how this affects the merged firm's performance, have been largely neglected

Within the marketing discipline, M&A-related research is almost totally absent A notable exception is a study by Capron and Hulland (1999) Their findings indicate that the redeployment of marketing resources has a significant effect on firm performance after M&A

The lack of attention given to marketing issues in the context of M&A is in sharp contrast with many statements that highlight the importance of marketing-related issues for M&A performance (e g , Becker and Flamer 1997, Clemente and Greenspan 1997) For example, Bekier and Shelton (2002) report that there is considerable risk of losing customers in M&A During the integration phase, managerial energy is often absorbed by internal issues, which can lead managers to neglect customer-related tasks (Hitt, Hoskisson, and Ireland 1990) This strong internal orientation is frequently accompanied by a decline in service quality (Urban and Pratt 2000) On the part of customers, this decline can result in uncertainties about their future relationship with the merging firms (e g , prices, quality of products and services, contact persons) Restraint and defection are possible customer reactions (Chakrabarti 1990, Reichheld and Henske 1991) Competitors' actions often reinforce this effect as they take advantage of the situation and try to alienate customers The relevance of market-related issues for the success of a PMI is also highlighted by Morall (1996, p 19), who claims on the basis of a case study that "cost reduction to make a merger pay off is not as important as customer retention" Because such market-related issues have been neglected in previous research, we argue that the research-based understanding of the factors that lead to M&A success is still limited to date

Against this background, we adopt a marketing perspective of M&A and explore three issues First, we investigate how the marketing integration process (extent and speed of integration) affects integration outcomes (magnitude of cost savings and market-related performance) Second, we investigate how these relationships are affected by certain moderators (customer orientation of integration, market growth, product/service industry, relatedness of the firms' market positioning, and relative size of the acquired firm) Third, we analyze the importance of market-related performance (compared with cost savings) for M&A performance

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Christian Homburg is Professor of Business Administration and Marketing and Chair of the Marketing Department, University of Mannheim (e-mail prof homburg@bwl uni-mannheim de) Matthias Bucerius was a doctoral student at this department Currently, he is a management consultant in the chemical and pharmaceutical industry (e-mail matthias@bucerius de) The authors thank the Stiftung Rheinische Hypothekenbank for supporting the research reported in this article and the University of St Gallen for providing access to its mergers and acquisitions database

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Theoretical Background, Framework, and Constructs

Theoretical Background

Our study is rooted in the resource-based theory, which explains superior performance by specific resources owned by the firm (Barney 1991, Peteraf 1993, Wernerfelt 1984) Following Barney (1991, p 101), we define resources "as assets, organizational processes, capabilities, firm attributes, information, knowledge, etc controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness " According to this theory, resources must meet four requirements—value, rarity, imperfect imitability, and insubstitutability (Barney 1991)—to affect firm performance

The resource-based view has been used frequently as a theoretical explanation for why M&A occur (e g , Anand and Singh 1997, Karim and Mitchell 2000) Many organizational theorists argue that firms face constraints (in terms of intellectual capabilities and time) with respect to the internal development of new resources (e g , Nelson and Winter 1982, Singh and Montgomery 1987) Therefore, many firms turn to the market to obtain new resources (Capron, Dussauge, and Mitchell 1998) Because few resources are available as single entities, firms must acquire entire businesses to extract value from the resources owned by the acquired firm (Barney 1986)

A key issue in M&A research that adopts a resource-based perspective is to what extent the merging firms integrate certain resources after a merger or acquisition to achieve a stronger competitive position and thus superior financial performance As an example, Capron, Dussauge, and Mitchell (1998) analyze performance implications associated with the integration of research and development, manufacturing, marketing, and managerial, financial, and senior executive resources These authors argue that among the resources with the potential to contribute to firms' postmerger performance, marketing resources, such as brands and sales forces, are a highly important subset In addition, marketing resources have been identified as resources that meet the previously mentioned requirements for relevancy for firm performance (Capron and Hulland 1999)

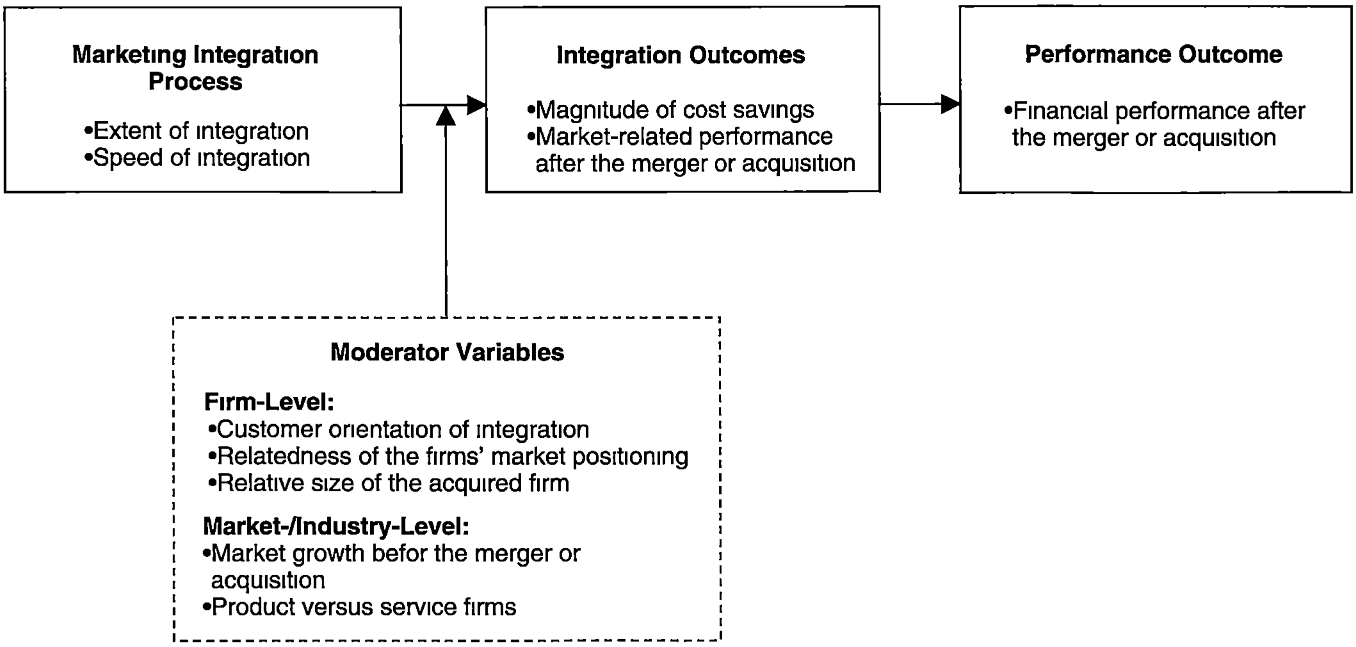
Thus, the resource-based perspective provides a theoretical basis for the fundamental proposition of our study, namely, that the integration of marketing resources is relevant for M&A performance We translate this proposition into specific constructs and hypotheses

Framework

Our unit of analysis is the total marketing activities of two merged firms The framework of our study is a causal chain with three categories of constructs marketing integration process, integration outcomes, and performance outcome after the merger or acquisition Figure 1 presents an overview of the framework and the specific constructs

Marketing integration process We define the *extent of integration* as the level of similarity achieved between two firms' marketing systems, structures, activities, and processes As an example, a typical question in PMI pertains to what extent the differences between two firms, in terms of their product and service offer, branding strategy, sales channels, and so forth, should be consolidated A high level of integration means that premerger differences between the

FIGURE 1
Framework and Constructs


Marketing Integration Process
•Extent of integration
•Speed of integration
Integration Outcomes
•Magnitude of cost savings
•Market-related performance after the merger or acquisition
Performance Outcome
•Financial performance after the merger or acquisition
Moderator Variables
Firm-Level:
•Customer orientation of integration
•Relatedness of the firms' market positioning
•Relative size of the acquired firm
Market-/Industry-Level:
•Market growth befor the merger or acquisition
•Product versus service firms

two organizations have largely disappeared This integration can be achieved by using a system, structure, activity, or process of either company for both firms It also can be achieved through combining the "best of both worlds" into a newly created system, structure, activity, or process A maximal extent of integration is achieved if all differences in the firms' marketing approaches are harmonized The extent of integration has been discussed as a key driver of M&A performance (e g , Birkinshaw, Bresman, and Hakanson 2000) [1]

Speed of integration is defined as the shortness of the time needed to achieve the intended level of marketing integration Although the importance of integration speed has been highlighted in many practitioner statements (e g , Bragado 1992, Mitchell 1989), this construct has been almost totally neglected in academic research (with the exception of some qualitative work in human resources management, e g , Buono and Bowditch 1989, Schweiger and Goulet 2000)

Integration and performance outcomes A distinction between cost-related and market-related integration outcomes is common (Chatterjee 1986) We define *magnitude of cost savings* as the extent to which the merging firms reduce the amount of resources and thus costs (in terms of personnel, infrastructure, and so on) compared with the sum of their resources before the transaction. The magnitude of cost savings is minimal if the postintegration costs are identical to the sum of the two firms' premerger costs

In addition to gains from cost reductions, M&A performance can also be influenced by the merging firms' ability to increase market-related performance and thus revenues after the transaction We define *market-related performance after the merger or acquisition* as the effectiveness of the combined firms' marketing activities Positive market-related outcomes of M&A (e g , customer loyalty, market share) may be based on phenomena such as intensified cross-selling and the use of expanded bundling opportunities (because of a broader product range), as well as improved negotiating positions toward customers

The key performance measure in our study is financial performance after the merger or acquisition Consistent with existing literature, we define the *financial performance after the merger or acquisition* as the postmerger profitability compared with the firms' premerger profitabilities (Datta 1991, Hunt 1990) This after/before comparison is typically used as an indicator of M&A success or failure (e g , Capron and Hulland 1999)

Moderator variables Potential moderating influences arise at the firm level and the market/industry level (see Figure 1) We based the selection of specific moderator variables on two considerations First, previous research on M&A has identified two constructs (i e , relatedness of the firms' market positioning and relative size of the acquired firm) with potential relevance for our study Second, we identified moderator variables (i e , customer orientation, market growth, and product/service industry) on the basis of previous marketing research We describe these moderator variables and justify their relevance in more detail in the following section

Hypotheses Development

Main Effects

Our first hypothesis addresses the link between the extent of integration and the magnitude of cost savings The basic logic is that a merger or acquisition creates redundancies that can be eliminated through integration More specifically, integration activities create the potential for a reduction in the amount of needed resources and thus costs (e g , personnel, infrastructure) (Capron 1999, Seth 1990a) Hypothesizing a positive impact of the extent of integration on cost savings is consistent with previous findings by Capron (1999) Thus,[2]

H_1 The extent of integration is positively associated with the magnitude of cost savings

Although we hypothesize that integration is beneficial in terms of cost savings, it is likely to be detrimental in terms of market-related performance Extensive marketing integration, in practical terms, leads to a reduced number of brands, product variants, service offers, distribution channels, and so forth Therefore, the merged firms' ability to adapt their offer to the needs of specific market segments is reduced through extensive integration This reduction can be detrimental for market-related performance because some customers may perceive the value provided by the merged firm as less attractive In addition, in the case of

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[1] The term "integration" has been used with different meanings in different literature streams As an example, literature in the field of international marketing (e g , Birkinshaw, Morrison, and Hulland 1995, Zou and Cavusgil 2002) has used integration specifically in terms of the integration of marketing activities across countries Our use of the term was guided by previous research in the M&A field and is consistent with this work (Pablo 1994, Shrivastava 1986)

[2] H_1 is not tautological in nature because there is a clear conceptual distinction between the independent construct and the dependent construct A high level of integration is not identical to a high level of cost savings for three reasons First, a high level of integration does not automatically imply that something positive has been achieved Rather, a high level of integration merely means that a high level of similarity has been achieved (for better or worse) between the two organizations with respect to a certain marketing aspect For example, if two information systems are replaced by one information system (i e , a high level of integration is achieved), the chosen integrated information system still may be complex to handle and therefore may increase costs Second, a high level of integration in some areas creates the potential for cost reductions However, this potential may or may not be exploited by managers Third, a high level of integration may be driven by the aim to increase effectiveness rather than reduce costs For example, if one company has better procedures in new product development or pricing, integration would primarily result in increases in effectiveness

extensive integration, firms are likely to reassess their joint customer portfolio and eliminate unprofitable customers or segments (i e , "controlled" loss of customers and market share) (Reichheld and Henske 1991)

Furthermore, during PMI, managerial energy is often strongly absorbed by internal issues at the expense of customer-related tasks (Hitt, Hoskisson, and Ireland 1990) This absorption is true for a high extent of integration because, in such circumstances, many internal decisions (e g , structures, staffing) must be prepared and made Therefore, in the case of a high extent of integration, the neglect of market- and customer-related tasks is more likely than in the case of a low extent of integration Customer dissatisfaction, restraint, and defection are likely consequences Thus,[3]

> H_2 The extent of integration is negatively associated with market-related performance after the merger or acquisition

Our reasoning regarding integration speed is based on the logic that an M&A activity creates uncertainty among customers, which may ultimately lead to customer defection Uncertainty is likely to increase over time if the integration phase is long We argue that the major beneficial effect of integration speed on M&A success is the uncertainty reduction for customers If integration decisions are made and implemented quickly, customers will know what to expect from the merged company in terms of the product offer, pricing policy, contact persons, and so forth Thus, customer uncertainty is reduced through a high level of integration speed In addition, it is a common business practice for competitors to try to increase uncertainty among the merging firms' customers to promote customer switching (Clemente and Greenspan 1997) This potential source of customer uncertainty can also be eliminated through high integration speed

Finally, a fast integration will lead to a reduced level of uncertainty among employees about their future in the merged company In particular, the uncertainty of customer contact personnel about their future in the company can lead to increased customer uncertainty and thus be harmful for market-related performance (e g , Singh, Goolsby, and Rhoads 1994) Thus,

> H_3 The speed of integration is positively associated with market-related performance after the merger or acquisition

We further argue that market-related performance has a positive impact on the magnitude of cost savings for two reasons First, a high level of customer loyalty after the transaction (which is a facet of market-related performance) enables companies to avoid costly activities directed toward attracting new customers Retaining customers is much less cost intensive than is attracting new customers (e g , Anderson, Fornell, and Rust 1997) Second, if market share (and consequently sales volume) increases, opportunities for cost savings through economies of scale emerge Our reasoning is also supported by findings that indicate a negative impact of market performance on costs (Phillips, Chang, and Buzzell 1983) Thus,

> H_4 The market-related performance after the merger or acquisition is positively associated with the magnitude of cost savings

We finally suggest that the magnitude of cost savings and market-related performance both lead to superior post-merger financial performance Because financial performance is defined in terms of profitability, the cost-related effect is obvious If costs decrease, all other things being equal, profitability increases Market-related performance after the merger or acquisition affects profitability through increased sales Positive relationships between market share and profitability (Szymanski, Bharadwaj, and Varadarajan 1993) and between customer loyalty and profitability (Kalwani and Narayandas 1995) have been documented in previous research In addition, hypothesizing these two positive effects is in line with previous empirical findings in M&A research (e g , Anand and Singh 1997) This leads us to the following hypotheses

> H_5 The magnitude of cost savings is positively associated with the financial performance after the merger or acquisition
>
> H_6 The market-related performance after the merger or acquisition is positively associated with the financial performance after the merger or acquisition

Moderating Effects

We develop hypotheses regarding the firm-level moderators (customer orientation of integration, relatedness of the firms' market positioning, relative size of the acquired firm) Subsequently, we discuss the effects of the market- and industry-level moderators (market growth before the merger or acquisition, distinction between product and service firms)

Customer orientation of integration As we described previously, PMI is often characterized by the strongly internal orientation of managers (Hitt, Hoskisson, and Ireland 1990) A possible consequence is that decisions are made predominantly on the basis of internal criteria, such as internal structures, processes, power distribution, or individual managers' preferences Against this background, we define *customer orientation of integration* as the extent to which decisions about marketing integration are driven by customer-related considerations rather than internal considerations For example, a high level of customer orientation of integration is present if decisions are strongly influenced by the goal of creating additional customer value rather than reducing the costs of serving customers

In the case of a high customer orientation in PMI, decisions are driven by cost reduction motives to a lesser extent

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[3] We do not find any compelling argument for either a positive or a negative direct impact of the extent of integration on financial performance after the merger or acquisition Therefore, we do not put forward a hypothesis corresponding to this possible link However, on the basis of our empirical results, we explore the magnitude of the indirect effects between extent of integration and financial performance through the magnitude of cost savings and market-related performance

Therefore, an increase in the extent of integration will produce less cost savings in this situation than in a context of low customer orientation Furthermore, we predict that a high level of customer orientation can alleviate, at least to some extent, the negative market-related consequences of integration When decisions to integrate brands, product variants, or distribution channels are made with a strong focus on customer value, the negative market-related consequences of a high level of the extent of integration should be weaker

Our argument regarding integration speed is that speed serves as a means to reduce uncertainty among customers We now argue that customer orientation serves as a partial substitute for speed in reducing customer uncertainty More specifically, when customers perceive that integration decisions are driven by customer-related considerations, their trust in the newly forming firm will increase and reduce uncertainty In other words, in the case of a high customer orientation, integration speed becomes less relevant as a means to reduce customer uncertainty and avoid detrimental effects on market-related performance We therefore predict that the effect of integration speed on market-related performance is weaker in the case of high rather than low customer orientation In summary, we hypothesize the following

H_7 In the case of high rather than low customer orientation of integration, the effect of the (a) extent of integration on cost savings is less positive, (b) extent of integration on market-related performance after the merger or acquisition is less negative, and (c) speed of integration on market-related performance after the merger or acquisition is less positive

Relatedness of the firms' market positioning We define *relatedness of the firms' market positioning* as the extent to which the firms' offers are similar in terms of the customer needs that they satisfy, quality, and price positioning This variable has been frequently analyzed in M&A research (e g , Chakrabarti 1990) Unlike previous research, our research question is not related to the possible direct performance effect of relatedness but rather to how relatedness affects the way that PMI should be conducted

Consistent with previous studies (e g , Hagedorn and Duysters 2002), we argue that a high level of relatedness offers a great potential for cost reductions Thus, an increase in the extent of integration may result in greater cost savings when the market positioning of the firms is highly related However, we do not find a compelling argument for why the relatedness of market positioning should moderate the impact of the extent of integration on market-related performance

The potential scope of changes (e g , repositioning the strategic focus of the entire firm) is much greater in M&A between unrelated firms (Larsson 1989) Because of the reduced potential for changes in highly related M&A, a lower level of uncertainty among customers about their future relationship with the merged firm is likely Because uncertainty reduction is the major effect of integration speed, we predict that an increase of integration speed has a smaller impact on market-related performance when relatedness is high Thus, we hypothesize the following

H_8 In the case of high as opposed to low relatedness between the merging firms' market positioning, the effect of the (a) extent of integration on cost savings is more positive and (b) speed of integration on market-related performance after the merger or acquisition is less positive

Relative size of the acquired firm We define the *relative size of the acquired firm* as the relative annual sales volume of the acquiree compared with that of the acquirer This variable has been frequently analyzed in previous M&A research There is substantial evidence that the potential to create value from M&A depends on relative size (e g , Capron 1999, Seth 1990b)

In the case of high relative size (i e , when the acquiree is almost as big as the acquirer), there is a greater increase in scale than in the case of low relative size Therefore, there is a greater potential for cost savings through integration in this case In addition, because organizational size is known to be an important driver of organizational structure (e g , Blau and Schoenherr 1971, Pugh et al 1969), we argue that there is more structural similarity between the organizations in the case of high relative size For example, firms with similar size should be structurally similar with respect to the presence or nonpresence of certain specialized units (e g , market research, key account management) within the company In other words, there will be a larger set of similar structures and therefore more redundancies in the case of high relative size so that the potential for cost reduction is greater

With respect to market-related performance, we predict that the negative effect of the extent of integration (H_2) is stronger in the case of a high relative size If the acquiree is fairly large compared with the acquirer, PMI is likely to involve more people, and its results will not be as clear from the beginning compared with the situation in which a relatively small firm has been acquired In these conditions, internal conflicts, interorganizational competition, holding back of information, and so forth, are likely consequences and will absorb managerial energy that is needed to serve customers Against this background, an increase in the integration extent will produce greater damage to market-related performance when the relative size of the acquired firm is high

With respect to integration speed, our reasoning related to relative size as a moderator variable is based on the contention that the number of customers affected by the transaction is greater when the relative size is high When the acquired firm is relatively small in proportion to the acquirer, only a small number of customers are affected by the integration activities With an increasing relative size, the customer base affected by the integration also broadens In turn, the potential for rumors about possible changes, which lead to uncertainties among customers, also increases Thus, an increase of integration speed is more likely to be beneficial for market-related performance when the relative size of the acquiree is high Thus,

H_9 In the case of high rather than low relative size of the acquired firm, the effect of the (a) extent of integration on cost savings is more positive, (b) extent of integration on market-related performance after the merger or acquisition is more negative, and (c) speed of integration on market-related performance after the merger or acquisition is more positive

Market growth Market growth is a frequently studied construct in marketing research We consider *market growth before the merger or acquisition* and argue that the potential for cost savings through extensive integration is greater in mature markets (i e , markets with low growth rates) than in high growth markets (e g , Budros 1999) This reasoning is based on the proposition that in mature markets, companies have accumulated a higher level of experience with respect to business processes and routines (Davis and Thomas 1993), which facilitates cost savings Thus, extensive integration in fast growing markets results in smaller cost savings than in low growth markets

We also hypothesize a moderating effect of market growth on the link between the extent of integration and market-related performance The logic behind our hypothesis is that in markets with low growth rates (which are typically in later life cycle stages), there is less dynamism than in high growth markets (e g , Wasson 1978) For example, market shares (e g , Arndt 1979) and the competitive environment (e g , less entry of new competitors, Day 1981) are more stable, and switching barriers, which make it costly and risky for a customer to change its supplier, are typically higher in mature markets (e g , Colgate and Lang 2001, Fornell 1992) Switching barriers may limit customer defection and thus reduce negative customer reactions to a high extent of integration Moreover, the number of competitors is usually lower in low growth than in high growth markets (e g , Buzzell 1981) Therefore, there are fewer alternative suppliers for the customer, and fewer competitors' actions to alienate customers will occur in low growth markets As a consequence, the negative impact of the extent of integration on market-related performance is stronger in high growth than in low growth markets

Our reasoning with respect to the impact of integration speed on market-related performance is based on a similar logic Because customers in mature markets are less likely to defect because of high switching barriers, fewer alternative suppliers, or fewer competitors' actions, we predict that the positive effect of speed is weaker in low growth markets This hypothesis is consistent with research that suggests that speed is less important if markets are growing slowly (Bowman and Gatignon 1995) In summary, we present the following hypothesis

H_{10} In the case of high rather than low market growth before the merger or acquisition, the effect of the (a) extent of integration on cost savings is less positive, (b) extent of integration on market-related performance after the merger or acquisition is more negative, and (c) speed of integration on market-related performance after the merger or acquisition is more positive

Manufacturing versus service firms Services exhibit higher levels of individualization than tangible products (e g , Zeithaml, Parasuraman, and Berry 1985) Therefore, we predict that translating a high extent of integration into significant cost savings is more difficult for firms that market services than for firms that market tangible products In other words, we predict that the effect of the extent of integration on cost savings is stronger for product than for service firms However, we do not find a compelling argument for why the distinction between product and service firms should moderate the impact of the extent of integration on market-related performance

In addition, a higher level of uncertainty among customers is a key characteristic of services (Zeithaml 1981), which is relevant for the hypothesized moderator effect with respect to the link between the speed of integration and market-related performance Avoiding customer uncertainty is particularly relevant in services industries (e g , Murray 1991) We therefore argue that the uncertainty-reducing effect of a high speed of integration is more important for firms that market services than for those that market tangible products Thus, we put forward the following hypothesis

H_{11} For firms that market tangible products (as opposed to services), the effect of the (a) extent of integration on cost savings is more positive and (b) speed of integration on market-related performance after the merger or acquisition is less positive

Table 1 presents an overview of the hypotheses related to moderating effects

Methodology

Sample and Data Collection Procedure

We used a survey methodology for data collection, which took place in 2002 The research was conducted in the German-speaking part of Central Europe (Germany, Austria, and Switzerland) with a strong focus on German firms The initial sample consisted of horizontal M&A that took place between companies based in these countries during 1996–1999[4] We identified the M&A from several sources, including the Mergers & Acquisitions Database of the University of St Gallen in Switzerland and several M&A-related European business magazines

We initially identified 3360 reported horizontal M&A On the basis of telephone calls with marketing/sales managers in the acquiring firm, we excluded those M&A in which the two firms' marketing activities remained totally independent In the same telephone call, we obtained the names of a senior executive or head of marketing and/or sales with responsibility for the PMI in the acquiring company[5] We identified managers responsible for the marketing integration of a total sample of 1483 M&A and sent questionnaires to them We made follow-up telephone calls to verify the contact name and to encourage response

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[4] We chose this period to exclude recent M&A in which the integration process was still in an early stage and had not yet led to any significant outcomes at the time of the survey, as well as older transactions for which it is difficult to obtain detailed information about integration activities because of managerial turnover We restricted our search to horizontal M&A (M&A that take place in the same industry, often between direct competitors) because the issue of marketing integration essentially only comes up in horizontal M&A

[5] We chose managers from the acquiring firm because they tend to be the most knowledgeable about the PMI In addition, because of managerial turnover, it is often impossible to identify former executives from the target firm (Walsh 1988)

TABLE 1
Hypotheses Related to Moderating Effects

	Main Effects Subject to Moderation		
	Extent of integration → cost savings	Extent of integration → market-related performance	Speed of integration → market-related performance
	Expected Direction of Main Effects		
Moderator Variables	**Positive**	**Negative**	**Positive**
Customer orientation of integration (COI)	Effect is less positive for high values of COI (H_{7a})	Effect is less negative for high values of COI (H_{7b})	Effect is less positive for high values of COI (H_{7c})
Relatedness of the firms' market positioning (RMP)	Effect is more positive for high values of RMP (H_{8a})	—	Effect is less positive for high values of RMP (H_{8b})
Relative size of the acquired firm (RS)	Effect is more positive for high values of RS (H_{9a})	Effect is more negative for high values of RS (H_{9b})	Effect is more positive for high values of RS (H_{9c})
Market growth before the merger or acquisition (MG)	Effect is less positive for high values of MG (H_{10a})	Effect is more negative for high values of MG (H_{10b})	Effect is more positive for high values of MG (H_{10c})
Product (PF) versus service firms (SF)	Effect is more positive for PF (H_{11a})	—	Effect is less positive for PF (H_{11b})

On the basis of the follow-up telephone calls and undeliverable mail, we found 181 firms that were inappropriate for the study However, 232 usable questionnaires were returned, for a response rate of 17 8% We tested nonresponse bias by comparing early versus late respondents (Armstrong and Overton 1977) We also analyzed whether the firms we initially addressed and the responding firms differed in terms of industry Both tests indicate that nonresponse bias is not a problem We present respondent and M&A characteristics in Table 2

Measure Development and Assessment

We followed standard psychometric scale development procedures (Gerbing and Anderson 1988) We were guided by a review of the literature (i e , construct definitions and existing scales used in marketing and M&A research), as well as by the results from ten field interviews with practitioners We provide a complete list of items in the Appendix

We assessed the extent of integration using eight items related to the extent to which the systems, structures, activities, and processes in marketing were made similar The specific items were partly based on items used by Datta (1991) The speed of integration was measured with the same eight items focusing on the shortness of the time period needed for the integration

We measured the construct magnitude of cost savings with nine items, including the reduction in the products and services offered, brands, marketing, and sales personnel The content of these items was largely generated through our field interviews The measurement of market-related performance after the merger or acquisition was based on previous conceptualizations of market-related performance in the literature (e g , Homburg and Pflesser 2000, Irving 1995) From these studies' scales, we selected those items that are particularly relevant in the context of M&A (i e , market share and customer loyalty) The conceptualization is also in line with previous research on M&A (e g , Capron 1999, Datta 1991)

Consistent with our definition and previous M&A research (e g , Anand and Singh 1997), financial performance after the merger or acquisition compares merging firms' profitability before and after the merger In line with previous M&A-related research (e g , Datta 1991, Hunt 1990), we use return on sales as our measure[6, 7]

We measured customer orientation of integration from the managers' perspective because customers are typically unaware of the driving forces behind company decisions Its operationalization was influenced by Narver and Slater's (1990) customer orientation scale Relatedness of the firms' market positioning refers to the extent to which the merging firms' offers are similar in terms of the customer needs they satisfy, such as quality or price positioning The construct was measured with five items based on previous research (Achrol 1992) Relative size of the acquired firm was measured with a single item and in accordance with studies by Capron and Hulland (1999) and Datta (1991) Market growth before the merger or acquisition was also measured with a single item Finally, we used our industry measure to categorize product and service firms (see Table 2) In Table

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[6] We used perceptual measures for market share and return on sales because respondents are typically reluctant to provide or do not know the precise numbers on performance constructs (Dess and Robinson 1984) Both problems may lead to respondents breaking up the response process, which reduces the achieved response rate (for similar arguments, see Datta 1991) Note, however, that we validated the perceptual profitability measure with objective data from an independent source

[7] Ultimate M&A success also depends on the price that was paid for the acquiree We did not include this aspect in our framework because managers are typically reluctant to provide this information In addition, for the majority of transactions, price information is not publicly available

TABLE 2
Sample Comparison (232 Cases)

A: Industry	**%**
Banks and insurance	38
Machinery	23
Food and packaged goods	11
Chemicals	8
Printing and publishing services	6
Automotive components	5
Pharmaceuticals	3
Other	4
Missing	2

B: Annual Revenues (of the consolidated business)	**%**
<$25 million	23
$25–$49 million	13
$50–$99 million	15
$100–$249 million	7
$250–$499 million	11
$500–$1,000 million	14
>$1,000 million	16
Missing	1

C: Position of Respondents	**%**
Managing director, chief executive officer, vice president of region, head of strategic business unit	67
Vice president marketing, vice president sales, vice president marketing and sales	18
Sales manager, product manager	6
Head of M&A	5
Other	2
Missing	2

D: Relative Size of Target to Acquirer (annual revenues)	**%**
<25%	38
25%–49%	23
50%–74%	13
75%–100%	10
>100%	14
Missing	2

3, we show the summary statistics and correlations among constructs and moderator variables

We analyzed measurement issues for each factor individually, and we provide the corresponding results in the Appendix The results indicate acceptable psychometric properties in terms of internal consistency for all constructs The average variances extracted and composite reliabilities are greater than the recommended threshold values of 5 and 6, respectively (Bagozzi and Yi 1988) In addition, all individual item reliabilities are greater than the required value of 4 (Bagozzi and Baumgartner 1994) Moreover, coefficient alpha values are greater than the threshold value of 7 (Nunnally 1978)

We assessed discriminant validity by performing pairwise chi-square difference tests in which we compared a perfect correlation model with a model in which the two factors were allowed to correlate freely (Joreskog and Sorbom 1982) We also applied the procedure suggested by Fornell and Larcker (1981) Both procedures indicated discriminant validity between all pairs of constructs

Further Measure Validation Through Additional Data

Because performance assessments based on self-reported data can be problematic, we conducted two additional data collections to ensure the validity of the financial performance measure and the customer loyalty measure, a component of market-related performance

For the validation of the financial performance measure, we identified all M&A in our sample for which both firms were publicly traded before the transaction In this case, profitability information before the merger or acquisition is publicly available for both the acquiring and the target firms These M&A represent 18 6% (i e , 43 cases) of our total sample We obtained sales volume and profitability information (return on sales) for these cases from a business information broker Using this information, we calculated the following profitability development index (PDI)

The year in which the transaction took place is t = 0 For each year preceding the merger or acquisition (i e , t = –3, t = –2, t = –1), we computed the relative magnitude of the two firms in terms of sales volume (AF = acquiring firm, TF = target firm) The specific formulas are as follows

$$(1) \qquad m_{A,t} = \frac{SAF_t}{SAF_t + STF_t} (t = -3, -2, -1), \text{ and}$$

$$m_{T,t} = 1 - m_{A,t},$$

where SAF refers to the sales volume of the acquiring firm and STF denotes the sales volume of the target firm We then computed the weighted average profitability of these firms for each year This weighted average profitability is

$$(2) \qquad PAF_t \times m_{A,t} + PTF_t \times m_{T,t}$$

for year t, where PAF_t and PTF_t denote the profitability of the acquiring firm and the target firm, respectively, in year t On the basis of these data, we computed the PDI as

$$(3) \quad PDI = \frac{1}{3}\sum_{t=1}^{3} PCF_t - \frac{1}{3}\sum_{t=-3}^{-1} \left(PAF_t \times m_{A,t} + PTF_t \times m_{T,t}\right),$$

where PCF_t denotes the profitability of the combined firm in year t Thus, this index compares the average profitability of the combined firm during the three years after the transaction with the weighted average profitability of both firms during the three years before the transaction A positive value of PDI indicates an increase in profitability For example, if the average return on sales is 5% before the merger and 7% after the merger, PDI equals 2

We then correlated the PDI values with managers' initial evaluations of profitability after the merger or acquisition (i e , the perceptual item used in our study) The correlation of 704 ($p <$ 01) indicates the high validity of the managerial assessment of postmerger financial performance

As a basis for the validation of the customer loyalty measure, we selected two industries from the total sample banks/insurance and machinery Two weeks after we completed the data collection, we contacted respondents in both industries by telephone We asked the managers to name three to five customers of the combined firm that had had a

TABLE 3
Correlations and Summary Statistics

Variables	Correlations 1	2	3	4	5	6	7	8	9
1 Extent of integration	1 00								
2 Speed of integration	273	1 00							
3 Magnitude of cost savings	297	209	1 00						
4 Market-related performance after the merger or acquisition	– 075	105	121	1 00					
5 Financial performance after the merger or acquisition	– 105	226	079	520	1 00				
6 Customer orientation of integration	357	304	140	256	184	1 00			
7 Relatedness of the firms' market positioning	484	261	139	– 071	– 044	236	1 00		
8 Relative size of the acquired firm	– 132	007	025	– 087	011	– 056	– 250	1 00	
9 Market growth before the merger or acquisition	128	129	– 060	096	– 054	129	094	– 103	1 00
Summary Statistics									
Range	1–7	1–5	1–7	1–7	1–7	1–7	1–7	1–5	1–9
Number of items	8	8	9	2	1	3	5	1	1
Mean	4 19	3 79	2 62	4 04	4 75	4 82	4 77	3 62	5 17
Standard deviation	1 72	98	1 25	96	1 30	1 72	1 30	1 44	1 21

business relationship with one of the firms at the time of the merger or acquisition Forty-eight respondents named at least three customers We then interviewed customers of 15 firms (2 customers per firm) in both industries by telephone, resulting in a total of 60 customer interviews We asked the customers about their loyalty toward the specific firm that had undergone the merger or acquisition and how their loyalty had changed since the merger or acquisition [8] We then correlated the loyalty assessments by customers with managers' initial evaluations of customer loyalty after PMI We obtained high correlations (757 for banks/insurance and 677 for machinery, $p <$ 01 for both industries), which indicate the high validity of the managerial assessments of customer loyalty

Results

After establishing the structure of the measurement model, we analyzed the overall causal model (reported in Figure 2) using LISREL 8 (Joreskog and Sorbom 1996) The fit statistics indicate an adequate fit of the model with the data (χ^2/degrees of freedom = 3 76, goodness-of-fit index = 94, adjusted goodness-of-fit index = 93, confirmatory fit index = 95, root mean square error of approximation = 07)

Results Related to Main Effects

In Figure 2, we summarize the results of our hypotheses testing As we show, all six hypotheses are supported by our empirical findings More specifically, each of the parameter estimates is significant at least at the 05 level The strongest effects are observed with respect to the link between market-related performance and financial performance and between the extent of integration and magnitude of cost savings [9]

The extent of integration has differential (i e , positive and negative) indirect effects on financial performance To explore the impact of the extent of integration on financial performance further, we computed the magnitudes of the three indirect effects and the resulting total effect The positive effect through cost savings (57 × 07 = 039) is confronted with two negative effects through market-related performance (– 23 × 67 = – 154) and a more complex causal chain through market-related performance and cost savings (– 23 × 12 × 07 = – 001) Thus, the total effect (– 116) is negative In other words, the positive effect of the extent of integration on financial performance (through cost savings) is reversed to a negative total effect through the negative market-related consequences of integration

Results Related to Moderating Effects

After we found support for the main effects, we assessed the influence of the five moderator variables We conducted separate median splits in our sample based on the values of each individual moderator We performed multiple group LISREL (Joreskog and Sorbom 1996) to compare the two subsamples (low versus high values of the moderator variable) for each moderator variable individually

In the first step, we compared two models that differ with respect to all effects we consider in our moderator analysis (γ_{11}, γ_{21}, γ_{22} for H_7, H_9, H_{11} and γ_{11}, γ_{22} for H_8,

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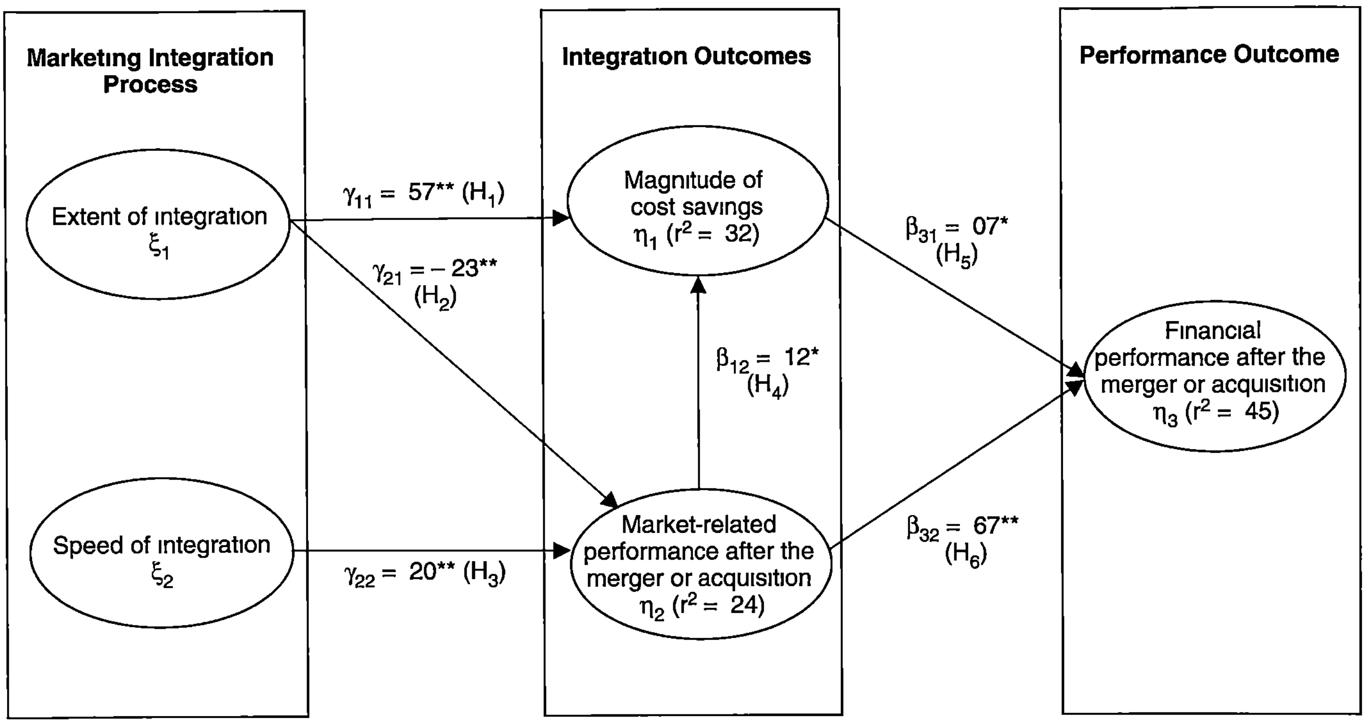
[8] We assessed customer loyalty in the validation sample using multiple items, such as the intentions to purchase from the specific firm again, expand the relationship with the firm, and recommend the firm to others The specific items were partly based on items used by Cannon and Homburg (2001) and Zeithaml, Berry, and Parasuraman (1996)

[9] On the basis of a suggestion by an anonymous reviewer, we also analyzed an alternative model in which the relationship under consideration runs in the opposite direction (i e , magnitude of cost savings is hypothesized to affect market-related performance) With respect to this alternative model, our findings indicate that the effect of the magnitude of cost savings on market-related performance is not significant (β_{21} = 04, $p >$ 1) In addition, the overall fit of the model is poorer than the fit of the model we propose

FIGURE 2
Results of the Hypotheses Testing (Main Effects)


Marketing Integration Process
Integration Outcomes
Performance Outcome
Extent of integration ξ_1
Speed of integration ξ_2
γ_{11} = 57** (H_1)
γ_{21} = – 23** (H_2)
γ_{22} = 20** (H_3)
Magnitude of cost savings η_1 (r^2 = 32)
β_{12} = 12* (H_4)
Market-related performance after the merger or acquisition η_2 (r^2 = 24)
β_{31} = 07* (H_5)
β_{32} = 67** (H_6)
Financial performance after the merger or acquisition η_3 (r^2 = 45)

*p < 05
**p < 01
Notes Completely standardized coefficients are shown

H_{10}) One model restricts these parameters to be equal across subsamples, whereas the more general model allows these parameters to vary across groups Because these are nested models, the χ^2 value will always be lower for the general model than for the restricted model The question is whether the improvement in χ^2, when moving from the restricted to the more general model, is significant This improvement would indicate that the moderator variable has an effect on the relationships under consideration The χ^2 statistic is significant for all five moderator variables (Table 4), thus, each moderator variable has some relevance in the context of our study

In the next step, we conducted more detailed analyses and compared, for each moderator, two models that differ only with respect to one specific effect (γ_{11}, γ_{21}, or γ_{22}) In this case, one model restricts the specific parameter to be equal across subsamples, whereas the more general model allows the specific parameter to vary across groups Again, the question is whether the improvement in χ^2 is significant This improvement would indicate differential effects in the two subsamples and thus a moderator effect We now discuss the results related to each moderator variable

With respect to the customer orientation of integration, the χ^2-difference values indicate a significant moderator effect for H_7 In addition, the parameter estimates obtained in the two subsamples support our theoretical reasoning because the effect is consistently weaker for high than for low levels of customer orientation In summary, H_7 is fully supported

H_8, which pertains to the moderating effects of the relatedness of the merging firms' market positioning, is also supported The results show that the moderating effects are not strong enough to moderate the effects under consideration In the conditions in which we predict and find a weaker effect, the effect is still significant

With respect to the relative size of the acquired firm, the χ^2-difference values indicate a significant moderator effect for H_{9a} and H_{9c} Furthermore, our theoretical reasoning is supported by the parameter estimates obtained in the two subsamples, in both cases, the effect is stronger for high than for low levels of relative size However, we fail to find support for H_{9b}, for which the χ^2 difference is not significant A possible explanation for this nonfinding is that our hypothesized strengthening moderator effect is compensated for by other weakening moderator effects For example, the acquisition of a relatively large target firm may yield a large number of competent managers and staff members, and gaining this resource may weaken the negative consequences in the marketplace Thus, H_9 is only partially supported

With regard to market growth before the merger or acquisition, H_{10a} is supported by our findings The χ^2 difference is significant, and the effect of the extent of integration on cost savings (γ_{11}) is stronger for low than for high market growth We fail to find support for H_{10b} because, contrary to our hypothesis, the negative link between the extent of integration and market-related performance is weaker in the case of high market growth Our argument for

TABLE 4
Results of Multiple Group Analysis

Moderator Variable	Main Effect	Hypothesized Moderator Effect	Low Value of Moderator	High Value of Moderator	χ^2 Difference (ΔDF = 1)
Customer orientation of integration (COI)	Extent of integration → cost savings (*positive*)	H_{7a} Effect is less positive for high values of COI	γ_{11} = 64 (t = 13 10)	γ_{11} = 47 (t = 6 50)	$\Delta\chi^2$ = 27 83**
	Extent of integration → market-related performance (*negative*)	H_{7b} Effect is less negative for high values of COI	γ_{21} = − 55 (t = −8 42)	γ_{21} = 10 (t = 1 61)	$\Delta\chi^2$ = 4 83*
	Speed of integration → market-related performance (*positive*)	H_{7c} Effect is less positive for high values of COI	γ_{22} = 18 (t = 4 03)	γ_{22} = − 08 (t = −1 28)	$\Delta\chi^2$ = 9 37**
		$\Delta\chi^2$ for all gammas set equal across subgroups (ΔDF = 3) 43 79**			
Relatedness of the firms' market positioning (RMP)	Extent of integration → cost savings (*positive*)	H_{8a} Effect is more positive for high values of RMP	γ_{11} = 38 (t = 8 79)	γ_{11} = 69 (t = 13 32)	$\Delta\chi^2$ = 16 83**
	Speed of integration → market-related performance (*positive*)	H_{8b} Effect is less positive for high values of RMP	γ_{22} = 24 (t = 5 26)	γ_{22} = 18 (t = 3 02)	$\Delta\chi^2$ = 3 80*
		$\Delta\chi^2$ for all gammas set equal across subgroups (ΔDF = 2) 20 63**			
Relative size of the acquired firm (RS)	Extent of integration → cost savings (*positive*)	H_{9a} Effect is more positive for high values of RS	γ_{11} = 15 (t = 4 71)	γ_{11} = 78 (t = 13 18)	$\Delta\chi^2$ = 46 41**
	Extent of integration → market-related performance (*negative*)	H_{9b} Effect is more negative for high values of RS	γ_{21} = − 33 (t = −7 31)	γ_{21} = − 14 (t = −1 32)	$\Delta\chi^2$ = 1 80
	Speed of integration → market-related performance (*positive*)	H_{9c} Effect is more positive for high values of RS	γ_{22} = 08 (t = 2 41)	γ_{22} = 60 (t = 4 73)	$\Delta\chi^2$ = 9 49**
		$\Delta\chi^2$ for all gammas set equal across subgroups (ΔDF = 3) 46 92**			
Market growth before the merger or acquisition (MG)	Extent of integration → cost savings (*positive*)	H_{10a} Effect is less positive for high values of MG	γ_{11} = 71 (t = 14 91)	γ_{11} = 31 (t = 10 14)	$\Delta\chi^2$ = 25 49**
	Extent of integration → market-related performance (*negative*)	H_{10b} Effect is more negative for high values of MG	γ_{21} = − 25 (t = −4 82)	γ_{21} = − 17 (t = −4 89)	$\Delta\chi^2$ = 5 85**
	Speed of integration → market-related performance (*positive*)	H_{10c} Effect is more positive for high values of MG	γ_{22} = − 13 (t = −3 77)	γ_{22} = 42 (t = 6 69)	$\Delta\chi^2$ = 31 04**
		$\Delta\chi^2$ for all gammas set equal across subgroups (ΔDF = 3) 57 67**			

TABLE 4
Continued

Moderator Variable	Main Effect	Hypothesized Moderator Effect	Product Firms	Service Firms	χ^2 Difference ($\Delta DF = 1$)
Product (PF) versus service firms (SF)	Extent of integration → cost savings (*positive*)	H_{11a} Effect is more positive for PF	$\gamma_{11} = 63$ ($t = 13\ 65$)	$\gamma_{11} = 43$ ($t = 12\ 47$)	$\Delta\chi^2 = 9\ 13^{**}$
	Speed of integration → market-related performance (*positive*)	H_{11b} Effect is less positive for PF	$\gamma_{22} = 19$ ($t = 4\ 31$)	$\gamma_{22} = 35$ ($t = 6\ 24$)	$\Delta\chi^2 = 9\ 26^{**}$
		$\Delta\chi^2$ for all gammas set equal across subgroups ($\Delta DF = 2$) $16\ 23^{**}$			

$^{*}p < 05$
$^{**}p < 01$

our hypothesis was that higher switching barriers, fewer alternative suppliers, and fewer competitors' attempts to promote customer switching in mature markets (i e , markets with a low growth rate) would weaken negative customer reactions A possible explanation for the finding is that the customer uncertainty created through a merger or acquisition is so strong that customers are highly receptive to competitors' offers and that switching barriers cannot prevent customers from reacting negatively

Our findings provide support for H_{10c} We observe a negative effect for the link between the speed of integration and market-related performance in the case of low market growth A possible explanation is that in the case of low market growth, the (positive) uncertainty-reducing effect of speed is outweighed by other mechanisms For example, fast integration decisions involve the risk of making wrong decisions that "can result in premature solutions" (Schweiger and Walsh 1990, p 61) In summary, we obtain partial support for H_{10}

For the distinction between product and service firms, both χ^2-difference values indicate a significant moderator effect According to the parameter estimates obtained in the two subsamples, H_{11} is fully supported The influence of the product/service distinction is not strong enough to moderate away one of the effects

Discussion

Research Issues

Previous M&A-related research has largely neglected marketing issues despite their immense importance Against this background, we adopted a marketing perspective toward M&A We believe that our study advances academic knowledge in our discipline in several ways

First, in line with the study by Capron and Hulland (1999), we contribute to bridging the gap between M&A-related research and marketing research Our findings provide support for the idea that PMI related to marketing is highly relevant for M&A performance

Second, we find that the extent of marketing integration has positive consequences in terms of cost savings, which are outweighed, however, by negative market-related consequences Thus, our research provides a deeper understanding of the performance implications of the postmerger extent of integration than has most previous M&A research (e g , Larsson and Finkelstein 1999) However, it is worth emphasizing that this finding relates to marketing integration and cannot be readily generalized to integration in other areas (e g , manufacturing, logistics, accounting)

Third, we show that the speed of integration, a construct neglected in previous M&A research, is beneficial in terms of market-related performance This finding extends previous conceptual discussions about the outcomes of speed in PMI (e g , Buono and Bowditch 1989, Schweiger and Walsh 1990) Whereas we agree with these purely conceptual studies that speed can have negative outcomes, our findings show that for market-related aspects of M&A performance, speed of marketing integration is beneficial Our reasoning—that fast integration processes can limit customer uncertainty and therefore enhance market performance—is supported by our data

Fourth, we show that there are contingency factors that systematically strengthen or weaken the relationships under consideration To the best of our knowledge, our study is the first to address theoretically and show empirically that the links between marketing integration and integration outcomes are not equally strong in every situation On a more general level, we draw the conclusion that marketing research and research in the strategy field should consider moderating effects to a greater extent than they have previously Although the number of articles analyzing moderating effects is growing, many empirical studies are still restricted to main effects This approach is likely to miss a significant part of the real structure of the relationships among the constructs under consideration

Fifth, we find that the negative market-related outcomes of a high level of integration are much weaker in the case of high customer orientation (H_{7b}) Together with the observation that many PMI phases are characterized by a strong internal orientation and a lack of customer orientation, this finding provides a possible explanation of why so many M&A fail We suggest that this is the case because of a lack of customer orientation during PMI

Sixth, our findings indicate that market-related performance is a much more important driver of financial performance after the merger or acquisition than are cost savings This finding is potentially relevant for other areas of marketing research Many marketing decisions involve a trade-off between saving costs and building strong market positions Our empirical study reveals a specific marketing approach (i e , extensive marketing integration in the PMI phase) that enables firms to save costs but only at the expense of their market position, which is more important in driving financial performance than are the cost reductions Although this finding cannot be readily generalized to other marketing approaches, we conclude that marketing researchers should be sensitive to the market position/cost trade-offs of specific marketing approaches This issue might be interesting to study with respect to the cross-country standardization of products and brands in the field of international marketing

Limitations and Avenues for Further Research

Several limitations of our study must be mentioned These limitations also provide avenues for further research First, the sample of our study is restricted to a specific region in Europe Additional research might use cross-country or cross-continent comparisons to study PMI

Second, our findings reveal that positive market-related effects are more important in driving financial performance than is cost reduction, a finding based on the total sample It may still be the case that for some mergers or acquisitions, cost savings are a more important driver of performance Further research might address this issue in more detail

Third, our study uses data obtained from customers to a limited extent Additional studies in this field should use customer-based data to a greater extent than we did to achieve a deeper understanding of the processes that drive customer reactions to M&A More specifically, research might measure the extent and speed of integration (with respect to the integration of customer-oriented activities such as product offers, brands, and sales forces) and market-related performance (with respect to customer loyalty) using customer survey data. Similarly, the moderator variable customer orientation of integration could be measured from the customers' perspective. This perspective would generate interesting and more general insights into the perception processes of customers during or after a merger or acquisition.

Fourth, our study uses perceptual measures for the magnitude of cost savings and extent of integration constructs. To make more precise financial predictions of how a certain reduction in costs affects return on sales, additional research might use objective measures of this construct. We also suggest that further research use objective measures of the extent of integration, which would require a content analytic approach to data collection in which researchers specifically consider the decisions made in the course of integration.

Fifth, our study merely considers the moderating effects of the customer orientation of integration. It is plausible that customer orientation of integration has a direct effect on cost savings and market-related performance. Thus, further work could analyze the additional effects of a customer orientation in PMI. In addition, it would be worthwhile to study how the customer orientation, in general, of either firm before the transaction affects the integration outcomes.

Sixth, our study considers the extent and speed of integration as independent variables. Additional studies could analyze which variables drive the extent and speed of marketing integration. As an example, researchers could analyze how the relative size of the acquired firm or relatedness of the firms' market positioning affects the extent and speed of integration.

Finally, our study focuses on cost savings and market-related performance as drivers of financial performance. An interesting issue for further research would be to study additional variables that influence postmerger performance, such as how increased prices as a consequence of a merger or acquisition affect financial performance.

Managerial Implications

A first managerial implication results from the finding that marketing integration affects financial performance negatively because the negative effects of market-related performance outweigh the positive effects of cost savings. Thus, managers should be cautious about postmerger marketing integration that is driven by the goal of reducing costs. Although it is realistic to expect cost savings from a high extent of integration, our findings show that there is a price to be paid for these cost savings on the market side. Our study also shows managers how to weaken these negative market-related consequences through a high level of customer orientation of integration, because this variable is a significant moderator of this link (H_{7b}). Thus, the specific implication for managers is that they should devote a lot of attention to customer-related issues when making decisions about PMI. For example, integration activities should be strongly guided by the needs of the merged firm's customers with respect to the product offer and customer service. Systematic customer surveys can be helpful in this context.

A second managerial implication is that, in general, managers should strive for speed in integrating their marketing operations after a merger or acquisition. Our research provides managers with information about the circumstances in which speed is particularly beneficial. For example, the effect of integration speed on market-related performance is particularly strong when the relatedness of the merging firms' market positioning is low, the relative size of the acquired firm is high, and the firms are service firms.

To give managers a more concrete picture with respect to the speed of integration, in Table 5, we provide detailed information about integration speed with respect to all the issues covered in the construct. These objective numbers can be used as benchmarking information by managers.

Finally, the analysis of market-related performance and cost savings as drivers of financial M&A performance leads to straightforward managerial implications. Managers involved in PMI should strongly focus on market-related issues. For example, concrete managerial actions during the integration phase could include the implementation of cus-

TABLE 5
Detailed Frequency Distributions for Speed of Integration

	Duration of Integration				
Items	**<6 months**	**6–12 months**	**13–18 months**	**19–24 months**	**>24 months**
1 Products/services offered	32.0%	34.5%	14.3%	10.8%	8.4%
2 New product development	29.9%	25.9%	22.4%	10.9%	10.9%
3 Prices	54.2%	26.8%	10.5%	4.7%	3.8%
4 Communication	56.4%	22.6%	10.8%	5.1%	5.1%
5 Sales system	36.7%	27.1%	20.3%	8.7%	7.2%
6 Sales force management	38.9%	23.8%	16.1%	12.4%	8.8%
7 Information systems	37.5%	26.0%	21.2%	8.2%	7.1%
8 Internal marketing/sales support	40.8%	25.1%	16.8%	9.4%	7.9%

tomer satisfaction–based incentive systems or continuous customer feedback instruments A predominant cost focus during PMI is likely to leave important performance potentials unexploited and lead to risks that produce negative outcomes in the market that cannibalize the success on the cost side

Conclusion

Our research provides strong evidence for the importance of studying M&A from a marketing perspective We show that the marketing integration process is highly relevant in driving ultimate M&A performance We also show that market-related performance is far more important than are cost savings Against this background, we conclude that the marketing discipline should devote more research attention to marketing issues in the context of M&A It has been argued that the marketing discipline has had a limited impact on the field of strategic management (e g , Day 1992) The discipline's influence can be increased only if key issues in corporate strategy are addressed from a marketing perspective by marketing scholars We propose that studying drivers of M&A performance is one of these key issues that must not be neglected by marketing researchers It is our hope that our study, following the pioneering work by Capron and Hulland (1999), contributes to the emergence of a research stream on M&A in marketing

APPENDIX
Scale Items for Construct Measure

Construct	Items	Individual Item Reliability[a]	Average Variance Extracted[a]	Composite Reliability/ Coefficient Alpha[b]
Extent of Integration (seven-point rating scale with anchors 1 = no integration, 4 = partial integration, and 7 = complete integration)	To what extent were the following aspects made similar between the two firms after the merger or acquisition?		74	96/ 83
	•Products/services offered (e g , harmonization of product ranges, brand names)	72		
	•New product development	40		
	•Prices (e g , harmonization of the price positioning)	82		
	•Communication (e g , harmonization of advertisement)	74		
	•Sales system (e g , harmonization of sales channels, sales partners, sales offices)	83		
	•Sales force management (e g , harmonization of the incentive and provision systems)	85		
	•Information systems (e g , harmonization of the marketing/sales information systems)	80		
	•Internal marketing/sales support	80		
Speed of Integration (five-point rating scale with 1 = more than 24 months, 2 = 19–24 months, 3 = 13–18 months, 4 = 6–12 months, and 5 = less than 6 months)	How long did it take to complete the intended integration of the following aspects?		58	89/ 82
	•Products/services offered (e g , harmonization of product ranges, brand names)	53		
	•New product development	40		
	•Prices (e g , harmonization of the price positioning)	58		
	•Communication (e g , harmonization of advertisement)	59		
	•Sales system (e g , harmonization of sales channels, sales partners, sales offices)	52		
	•Sales force management (e g , harmonization of the incentive and provision systems)	66		
	•Information systems (e g , harmonization of the marketing/sales information systems)	62		
	•Internal marketing/sales support	76		
Magnitude of Cost Savings (seven-point rating scale with anchors 1 = not reduced at all and 7 = strongly reduced)	To what extent were the following resources reduced as a result of the merger or acquisition? (Please refer to both firms together)		50	89/ 85
	•Products offered	43		
	•Services offered	41		
	•Brands	49		
	•Strategic business units	54		
	•Sales channels	47		
	•Production locations	45		
	•Sales offices	65		
	•Total employees in marketing	66		
	•Total employees in sales	65		

APPENDIX
Continued

Construct	Items	Individual Item Reliability[a]	Average Variance Extracted[a]	Composite Reliability/ Coefficient Alpha[b]
Market-Related Performance After the Merger or Acquisition (seven-point rating scale with anchors 1 = significant decline, 4 = more or less the same, and 7 = significant increase)	Compared to the situation before the merger or acquisition, please indicate how have the merging firms together performed with respect to market share (please consider the sum of both companies)	—	—	—/76
(seven-point rating scale with anchors 1 = clearly worse, 4 = competition level, and 7 = clearly better)	Relative to your competitors, how have the merging firms together performed with respect to retaining existing customers after the integration was completed	—		
Financial Performance After the Merger or Acquisition (seven-point rating scale with anchors 1 = significant decline, 4 = more or less the same, and 7 = significant increase)	Compared to the situation before the merger or acquisition, please indicate how the return on sales has developed (please consider the sum of both companies)	—	—	—
Customer Orientation of Integration (seven-point rating scale with anchors 1 = strongly disagree and 7 = strongly agree)	Please indicate the degree to which you agree with the following statements concerning the fundamental orientation of the integration process after the merger or acquisition		85	95/93
	•Customer needs were decisive for the realization of integration activities	80		
	•Customer needs were the central focus during the integration process	99		
	•Integration activities were focused on the increase of customer benefit	77		
Relatedness of the Firms' Market Positioning (seven-point rating scale with anchors 1 = strongly disagree and 7 = strongly agree)	Please indicate the degree to which you agree with the following statements concerning the market positioning of your company and the other company before the M/A?		53	85/81
	•The products/services of both companies were focused on the satisfaction of the same customer needs	49		
	•The products/services of both companies were mainly based on the same technologies	59		
	•The products/services of both companies were mainly identical in quality	51		
	•The products/services of both companies were mainly sold through the same distribution channels	55		
	•The price positioning of the offers of both companies was mainly identical	50		

APPENDIX
Continued

Construct	Items	Individual Item Reliability[a]	Average Variance Extracted[a]	Composite Reliability/ Coefficient Alpha[b]
Relative Size of the Acquired Firm (five-point-rating scale with 1 = <25%, 2 = 25%–49%, 3 = 50%–74%, 4 = 75%–100%, and 5 = >100%)	Please indicate the relative proportion of the acquired firm's annual sales in comparison to your firm's sales in the year before the merger or acquisition (in the line of business concerned)	—	—	—
Market Growth Before the Merger or Acquisition (nine-point-rating scale with 1 = decrease >15%, 2 = decrease 5%–15%, 3 = decrease up to 5%, 4 = increase up to 5%, 5 = increase 5%–10%, 6 = relatively constant, 7 = increase 10%–20%, 8 = increase 20%–30%, and 9 = increase >30%)	Please indicate the average annual growth rate (over the last three years before the merger or acquisition) of the total demand in the market concerned	—	—	—

[a]Individual item reliability and average variance extracted are reported when there are more than two items
[b]Reports coefficient alpha (if more than one item) and composite reliability (if more than two items)

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Jaideep C. Prabhu, Rajesh K. Chandy, & Mark E. Ellis

The Impact of Acquisitions on Innovation: Poison Pill, Placebo, or Tonic?

Do acquisitions increase, decrease, or have no effect on innovation? The empirical research on this question suggests that acquisitions may hurt innovation, that is, they may be a "poison pill" for innovation The authors present an alternative view For firms that first engage in internal knowledge development, the knowledge-based view the authors present suggests that acquisitions can help innovation, that is, they can be a tonic for innovation Analysis of cross-sectional, time-series data on a sample of pharmaceutical firms during 1988–97 provides evidence to support the thesis

Many firms consider the acquisition of other firms a way to co-opt and build on ideas from outside Over the past several years, the volume of acquisitions in the United States has been measured in the trillions of dollars (Mergerstat 2003) Acquisitions are especially prevalent in high-tech contexts, in which the level of market and technological uncertainty is often so great that an exclusive reliance on knowledge created within the firm can be dangerous (see John, Weiss, and Dutta 1999, Rindfleisch and Moorman 2001, Wind and Mahajan 1997) Industry-defining ideas can arise outside the firm, even outside the industry A strategy based solely on internally built knowledge is likely to delay or inhibit access to these ideas—sometimes with fatal consequences Saxenian (1994), for example, notes that Digital Equipment Corporation's overriding reliance on internally built knowledge was a prime cause of its decline and subsequent takeover by the upstart Compaq Corporation For these and other reasons, marketing scholars have highlighted the potential for innovation through acquisitions (see Wind and Mahajan 1997) As Capon and Glazer (1987, p 6) point out "a well-planned policy of external acquisition affords technology strategy options that a 'go-it-alone' attitude would preclude"

Given the importance of the topic, many studies have explored the link between acquisitions and innovation The empirical evidence so far is not encouraging Research suggests that acquisitions tend to hurt, not help, innovation (Ernst and Vitt 2000, Hitt et al 1991a, Miller 1990, for a recent exception, see Ahuja and Katila 2001) The bulk of the research implies that firms in search of innovation may do well to steer clear of acquisitions Some researchers argue that the many activities involved in trying to consummate and integrate acquisitions can distract managers from the task of innovation (Hitt, Hoskisson, and Ireland 1990) Others note that key employees, including scientists and champions of innovation, may leave the firm after acquisition (Ernst and Vitt 2000) Researchers also point out that firms may take on considerable debt to finance acquisitions, the interest expenses and repayments associated with this debt may choke off much-needed funds for innovation (Hitt et al 1991b) For these reasons, acquisitions have been referred to as a "poison pill" for innovation (Hitt et al 1991b, p 22) At best, acquisitions are simply considered to be a placebo, having no effect on innovation (see Jensen 1988)

However, the research on acquisition and innovation has focused on firms in the aggregate, without further exploring differences among firms Most studies have sought to answer the general question, Are acquisitions good or bad for innovation? However, firms vary widely in their ability to convert external knowledge into innovation outcomes For example, some observers attribute Johnson & Johnson's strong innovation record to its ability to spot good targets and manage them better than other firms do (Barrett 2002) Therefore, a different and potentially more useful question is, Why are some firms better at generating innovations from acquisitions than others? This is the question we address in this research

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Jaideep C Prabhu is Professor of Marketing, Tanaka Business School, Imperial College London (e-mail j prabhu@imperial ac uk) Rajesh K Chandy is Associate Professor of Marketing, Carlson School of Management, University of Minnesota (e-mail rchandy@csom umn edu) Mark E Ellis is an MBA student, Harvard Business School (e-mail meellis@alumni princeton edu) The authors are grateful for the valuable input of Kersi Antia, Mark Bergen, Ed Blair, Jack Chen, George John, Om Narasimhan, Akshay Rao, Alina Sorescu, Myles Shaver, Stefan Stremersch, Gerry Tellis, Frank Windmeijer, the four anonymous *JM* reviewers, and participants at research seminars at City University (London), Dartmouth College, Emory University, University of Houston, Maastricht University, University of Minnesota, University of Missouri, University of Pittsburgh, Texas Christian University, and the University of Washington The authors appreciate the help of Brigitte Hopstaken, Anthony Maughan-Brown, Luis Wasserman, Raghunath Rao, and Sonia Basu-Monga in the data collection process

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In this article, we aim to make three main contributions to the literature First, we present a knowledge-based view of the firm that highlights reasons some firms are better than others at innovation through acquisition We argue that firms that are rich in internal knowledge to begin with are likely to achieve significantly greater innovation from their acquisitions than are other firms By doing so, we show that prior research, in failing to employ such a knowledge-based view, has arrived at premature and overly pessimistic conclusions about the impact of acquisitions on innovation Instead of acquisitions being a poison pill or placebo, as prior research has concluded, we show how acquisitions might work as a tonic for innovation

Second, we complement the growing literature in marketing on the development of internally built knowledge by highlighting a hitherto overlooked benefit of such knowledge We show that a sustained process of internal knowledge building in particular technological areas can pay off by enabling firms to better identify and assimilate knowledge bought from other firms In doing so, we show the synergies to be gained by a program that combines internal with external knowledge Indeed, our results show that examination of internal and external knowledge in isolation leads to an underestimation of the influence of either form of knowledge on innovation

Third, we aim to make an important methodological contribution We believe that limitations in the data and methods used in the existing empirical research cause the research results to be less than conclusive For example, studies thus far tend to ignore a key metric of innovation new products This is the innovation output that is of most relevance to marketing scholars Existing studies examine innovation input (e g , research and development [R&D] expenditures) or intermediate output (e g , patents) Ours is the first study (to our knowledge) to address the impact of acquisitions on product innovation

Conceptual Framework and Hypotheses

The concept of knowledge is central to our thesis We argue that a firm's internal knowledge is a key predictor of its ability to use external knowledge to create innovations We use arguments from organizational theory on absorptive capacity (Cohen and Levinthal 1990, Kogut and Zander 1992) and the knowledge-based view of the firm (Bierly and Chakrabarti 1996, Grant 1996, Nonaka 1994, Spender 1996, Winter 1987) as well as recent work in marketing (especially John, Weiss, and Dutta 1999) to develop our arguments on the role of knowledge in postacquisition innovation These arguments highlight why innovation from acquisitions is challenging yet ultimately feasible

In this article, we focus on a particular type of knowledge technical knowledge We define technical knowledge as scientific knowledge applied to useful purposes In prior research, this construct has sometimes been called technical know-how (John, Weiss, and Dutta 1999)

Technical knowledge is not easily transferred across different fields (Henderson and Cockburn 1994, John, Weiss, and Dutta 1999, Pisano 1994) Technical knowledge across different fields is, however, potentially combinable (Kogut and Zander 1992, Reed and DeFillipi 1990) The field-specific nature of technical knowledge underscores the need to study, in the acquisitions context, the depth (within fields), the breadth (across fields), and the similarity of the acquirer's knowledge with the fields in which the target has knowledge For the sake of simplicity in exposition, we henceforth use the term *knowledge* to refer to technical knowledge

Dimensions of Knowledge: Depth, Breadth, and Similarity

We define knowledge depth, breadth, and similarity as follows *Depth* refers to the amount of within-field knowledge possessed by the acquiring firm *Breadth* is the range of fields over which the firm has knowledge *Similarity* is the extent of overlap in the fields of knowledge of the acquirer and target firms Prior discussions of knowledge have implicitly focused on depth of knowledge (e g , John, Weiss, and Dutta 1999), though even this variable has not been examined in the acquisitions context However, the difficulty of transferring knowledge across fields implies that breadth and similarity of knowledge are also critical in the acquisitions context

Sources of Knowledge: Internal Versus External Knowledge

Knowledge differs not only in the dimensions discussed previously but also in its sources Internal knowledge is based on learning by members of the firm, it results from the creation and distribution of knowledge within the boundaries of the firm (Chesbrough and Teece 1996) External knowledge, in contrast, originates from outside the firm We use the terms *internal* and *external knowledge* in the spirit of Friedman, Berg, and Duncan (1979, p 103), Bierly and Chakrabarti (1996, p 127), Van den Bosch, Volberda, and de Boer (1999, p 566), and Madhok and Osegowitsch (2000, p 329) and differently from *internalization* as used by Nonaka (1994)

Acquisitions provide an important means to bring external knowledge into the firm (Bierly and Chakrabarti 1996) The emphasis in prior research on these two sources of knowledge has typically been on examining the trade-off between the two in a static sense Thus, internal knowledge has been shown to enable firms to develop core competencies, especially in domains that are complex and deeply integrated with other domains of knowledge (Chesbrough and Teece 1996) In contrast, external knowledge is more likely to enable firms to keep abreast of new technical developments, thus increasing the flexibility of the firm in dynamic environments (Grant 1996)

By maintaining and replenishing their stock of knowledge on a continuous basis, firms that combine internal and external knowledge can reduce the chances of being locked out of areas of future technological and commercial importance (Cohen and Levinthal 1989, Schilling 1998) Much of the literature on combining internal with external knowledge is conceptual (see Cohen and Levinthal 1989, Zahra and George 2002) Only recently have researchers begun to test some of these ideas empirically (e g , Cockburn and Henderson 1998, Lane and Lubatkin 1998, Moorman and Slotegraaf 1999) We are aware of no study that has applied these ideas in the area of acquisitions in general or acquisitions and innovation in particular This is the focus of our research A recent study (Wuyts, Dutta, and Stremersch 2004) examines the role of alliances in product innovation However, (1) that study examines alliances, whereas ours examines acquisitions, and (2) that study examines technological diversity, whereas ours examines the depth, breadth, and similarity of technical knowledge We next present hypotheses on the main effect of internal knowledge and then the interaction effect of internal and external knowledge in the context of acquisitions and innovation

Depth of Knowledge and Innovation

A firm's ability to create knowledge is a key driver of its ability to innovate (see Griliches 1984) New knowledge does not arise in a vacuum, rather, it is a path-dependent outcome of building on prior knowledge However, as noted previously, knowledge is field specific in nature Firms are therefore likely to vary in the depth of knowledge they have in a particular field

The effects of depth of knowledge on innovation are not straightforward Some researchers have argued that greater depth in knowledge could, ceteris paribus, lead to the setting in of core rigidities, which in turn could decrease innovation (Leonard-Barton 1992) However, a larger and more recent stream of research indicates that inadequate knowledge in a particular field can result in firms being locked out of developing or assimilating new knowledge in that area (Zahra and George 2002) Specifically, to be able to develop new knowledge in a field, firms must already possess some knowledge in that field Developing depth in key fields enables firms to produce new knowledge in those fields, gain competency in core product areas, and thus innovate (Bierly and Chakrabarti 1996, Hamel and Prahalad 1994) As a result, there is likely to be a main effect of depth of knowledge on the innovation activity of firms The deeper a firm's knowledge in certain fields, the greater is its ability to create innovations in these and related fields

In addition to this main effect, there is likely to be an interaction effect of depth of internal knowledge and external knowledge from acquisitions Successful innovation from acquisition involves the ability to choose the target with the most promising knowledge, absorb the knowledge made available by the target, and exploit it to create new knowledge Firms that differ in depth vary in their ability to evaluate, absorb, and build on external knowledge and therefore derive different levels of innovation from such knowledge Firms with low depth are likely to fall prey to technological lockout (Cohen and Levinthal 1989) Such firms may not be able to assess accurately the innovation potential of targets Compared with firms with high depth, these firms may acquire targets with less innovation potential Furthermore, given their lack of experience in creating knowledge, they are likely to manage acquisitions (even those with high innovation potential) poorly Key technical personnel from the target firm may leave the combined firm because of a perceived lack of prestige or appreciation for their activities

Firms with high depth, in contrast, are better able to evaluate and manage new knowledge and use it to innovate (Cohen and Levinthal 1990) They are therefore best positioned to leverage acquisitions to create innovations For all these reasons, we expect that

H_1 Firms with high depth of knowledge produce more innovations than do firms with low depth of knowledge

H_2 Firms with high depth of knowledge produce more innovations from acquisitions than do firms with low depth of knowledge

Breadth of Knowledge and Innovation

Just as they vary in depth, firms also vary in the breadth of knowledge they possess Again, the effects of breadth on innovation are not obvious Some researchers have noted that greater breadth in knowledge could, ceteris paribus, cause the firm to spread resources too thinly (e g , Wernerfelt and Montgomery 1988) Breadth can also cause distraction within the firm, thus lowering innovation

However, the bulk of the knowledge-based literature suggests that breadth in knowledge is helpful for innovation (Bierly and Chakrabarti 1996, Cohen and Levinthal 1990, Henderson 1994, Henderson and Cockburn 1994) Several researchers have pointed out the importance of being able to integrate knowledge from across different fields, especially in technically complex industries (Henderson and Cockburn 1994, Pisano 1994, Volberda 1996) The broader a firm's existing knowledge, the greater is its ability to combine knowledge in related fields in a more complex and creative manner (Bierly and Chakrabarti 1996, Kogut and Zander 1992, Reed and DeFillipi 1990) In addition, the potential for "happy accidents," whereby concepts from one field are applied to a different field in hitherto unexpected ways, increases with greater breadth of knowledge

Moreover, firms with a broad base of knowledge are less likely to develop core rigidities and thus be locked out of emerging technical domains (Leonard-Barton 1995) With changes in market preferences and technological opportunities, knowledge that was once a source of competitive advantage may become irrelevant Low breadth makes the firm especially vulnerable to such irrelevance Broader knowledge, however, gives the firm greater flexibility and adaptability in responding to environmental change (Volberda 1996) Overall, these arguments suggest that the broader a firm's knowledge, the greater is its ability to create innovations

As does depth, breadth is likely to have an interaction effect with acquisitions Given the field-specific nature of knowledge, a firm with low breadth is perforce faced with a greater number of targets that lie outside its own field of knowledge Therefore, the probability is higher that it will choose acquisition targets outside its own field, from fields that are unfamiliar to it (Chaudhuri and Tabrizi 1999, Hitt, Harrison, and Ireland 2001) When acquiring from outside its own field, a firm with narrow knowledge is likely to be handicapped by its lack of expertise in the other fields (see

Cohen and Levinthal 1990, Rosenberg 1982, Zahra and George 2002) It may, for example, choose targets that others with more knowledge in the field may avoid (e g , Morck, Shleifer, and Vishny 1988) More important, when it acquires such targets, it may be less able to manage and exploit, after the acquisition, the unfamiliar knowledge it has acquired through the target firm (Haspeslagh and Jemison 1991)

In the context of acquisitions, the successful exploitation of an acquired firm involves the ability to absorb the knowledge of the target firm and then use it to develop still newer knowledge (Jemison 1988) The greater the breadth of the acquirer's knowledge, the greater is its ability to absorb the knowledge of the target firm and the greater is its potential for discovery (and therefore innovation) after the acquisition, both by accident and through planning Therefore,

> H_3 Firms with high breadth of knowledge produce more innovations than do firms with low breadth of knowledge
>
> H_4 Firms with high breadth of knowledge produce more innovations from acquisitions than do firms with low breadth of knowledge

Similarity of Knowledge and Innovation

The similarity of knowledge between the acquirer and the target is crucial to the acquirer's ability to absorb the target's knowledge and use it for innovation (Mowery, Oxley, and Silverman 1996) In general, prior research (though not directly focused on the acquisitions context) implies a linear relationship between similarity of knowledge among firms and innovation outcomes from joint activities (Henderson 1994, Henderson and Cockburn 1994) In an empirical study of strategic alliances, Lane and Lubatkin (1998) show that one firm's ability to exploit the knowledge of another depends on the similarity of both firms' knowledge bases Cohen and Levinthal (1990) state that for firms to facilitate absorption of new knowledge, the prior knowledge should be closely related to it

In contrast to the linear effects implied by prior research, we argue that a nonlinear relationship between similarity of knowledge and innovation is more likely (see also Ahuja and Katila 2001) Greater similarity between the acquirer and the target will make it easier for the acquirer to absorb the knowledge of the target firm Similarity may also lead to easier postacquisition integration, less turnover of key inventors, and therefore greater innovation However, in the case of highly similar acquisitions, there will also be less new knowledge to absorb Too much relatedness will result in overlapping and redundant research (e g , Rindfleisch and Moorman 2001) There will also be fewer knowledge synergies and therefore fewer opportunities for combining different types of knowledge in creative ways

In contrast, if the two firms' knowledge is very dissimilar, the external knowledge will be difficult for the acquirer to absorb in the first place In the context of acquisitions, because absorbing the knowledge of the target is a prerequisite for using it to create new knowledge, very dissimilar knowledge will make it difficult to generate innovations after the acquisition Therefore, we hypothesize an inverted U-shaped relationship between the similarity and innovation

> H_5 Firms with moderate similarity of knowledge produce more innovations from acquisitions than do firms with very high or very low similarity of knowledge

Method

Through our methodological approach, we attempt to avoid several pitfalls that are evident in research on acquisition and innovation Data limitations have constrained the focus of much prior research to acquisitions in which the targets are large, publicly held companies The Federal Trade Commission's *Large Merger Series* is a commonly used source of data on acquisitions, but this database includes only data on acquisitions of the largest target firms It is possible that the distraction and debt arguments noted in the literature are particularly severe for acquisitions involving large targets A vast majority of acquisitions involve small and privately held targets (see U S Small Business Administration 1998) The debt and distraction problems may be less acute for such targets In this research, we study not only large acquisitions but also those involving small and medium-sized targets We control for heterogeneity due to firm-specific effects by employing a unique panel data set that we specifically construct for this study

In addition, research thus far has generally focused on the immediate effects of acquisitions on innovation (see Hitt et al 1991a) However, there could be many lags involved in assimilating acquisitions and generating innovations from them The true effects of acquisitions may become evident only over a longer term, perhaps over multiple years To assess more completely the impact of acquisitions on innovation, we apply distributed-lag models to measure not only the current effects of acquisitions but also their future effects This section describes the empirical context, data, and analysis used in this research

Empirical Context

Knowledge manifests itself in different ways in different industries The metrics used to measure knowledge therefore need to vary from industry to industry The measurement of knowledge across multiple industries is likely to be prone to substantial errors because any uniform metric for knowledge may understate the true knowledge in some contexts while overstating it in others For this reason, we focus on a single industry to test our hypotheses

The empirical context for this study is the pharmaceutical industry This context is especially suitable for our purpose First, innovation is a particularly critical activity in the pharmaceutical industry (Graves and Langowitz 1993, Jensen 1987, Koberstein 2000, Scherer 1993) Innovative firms in this industry benefit from large and persistent competitive advantage (Comanor 1986, Cool and Dierickx 1993, Henderson and Cockburn 1994)

Second, this industry is characterized by a heavy reliance on knowledge that is codified in the form of patents (Cohen, Nelson, and Walsh 2000, Levin et al 1987, Mansfield 1986) Both product and process innovations are patented at high rates in this industry, and pharmaceutical firms view patenting as an effective means to prevent competitors from copying innovations (Cohen, Nelson, and Walsh 2000, Klevorick et al 1995) This reliance on patents allows for a relatively clean yet comprehensive metric for knowledge

Third, the pharmaceutical industry is an important and widely studied context A considerable volume of academic research has focused on this industry (e g , Bierly and Chakrabarti 1996, Cockburn, Henderson, and Stern 1999, Lichtenberg 1998, Yeoh and Roth 1999, for reviews, see Comanor 1986, Scherer 1993) Although acquisitions are a salient issue in the industry, their impact on innovation has not received much academic attention

Sampling Procedure

To identify our sample group, we randomly selected 47 companies from a population of 185 pharmaceutical companies in the *Financial Times Sequencer*, an international database of share price data, financial news articles, key financial ratios, and balance sheet and profit and loss data To assess list validity, we compared a random sample of 40 companies from the *Sequencer* list with a similar list from the *Datastream International* database This comparison indicated a high degree of overlap between the samples in the two lists

Of the 47 companies in our *Sequencer* list, we filtered 12 out so that the final sample included only firms that were U S based, existed as independent entities during the period from 1988 through 1997, and had pharmaceuticals as the primary line of business We collected information on the group of 35 acquirers over a ten-year sample period from 1988 through 1997 The firms in the acquirer data set collectively acquired 157 targets during the sample period Recall that much of the existing research on acquisition and innovation uses the Federal Trade Commission's *Large Merger Series* database Our data are more representative of the population of pharmaceutical firms than the *Large Merger Series* data for two reasons First, our data consist of all acquisitions by a random sample of (public) firms We therefore include all acquisitions by the firms in our sample, whereas the *Large Merger Series* includes only the largest acquisitions Second, several firms in our randomly selected sample of acquirers are small, whereas the *Large Merger Series* data include only the largest acquirers

Measures and Data Sources

We use archival time-series data to measure our conceptual variables We do so because a proper accounting of the future effects of acquisitions requires data over time Survey data on a long enough time series are difficult to obtain Furthermore, survey data on knowledge and innovation are prone to self-report and memory biases

We were unable to find a single database that contains cross-sectional, time-series data on all our variables of interest We therefore put together our database on a firm-by-firm and year-by-year basis, using different sources for different variables Table 1 provides a summary of the measures and data sources We provide information on each of the key measures next

TABLE 1
Summary of Measures and Data Sources

Conceptual Variables	Measure (Annual)	Data Source
Innovation	Number of Phase 1 products (four-year lag)	Pharmaprojects
Acquisitions	Number of acquisitions	*Moody's Manual* *Financial Times Sequencer*
Depth of knowledge	Average number of approved patents per patent subclass	U S Patent and Trademark Office World Intellectual Property Organization Delphion
Breadth of knowledge	Number of patent subclasses approved	World Intellectual Property Organization Delphion
Similarity of knowledge	Proportion of patent subclasses shared by acquirer and target	World Intellectual Property Organization Delphion
Control variables	Acquirer R&D expenditures, sales, and number of employees Biotechnology focus Number of target firm patents Target size Target value Nonpharmaceutical targets[a] Foreign targets Market capitalization Number of product approvals	Securities and Exchange Commission's Edgar database Hoover's Online Trade and popular press reports COMPUSTAT Pharmaprojects SDC Platinum Factiva

[a] Standard Industrial Classification

Innovation Innovation occurs at many stages in the pharmaceutical industry from the discovery of new molecules to the introduction of drugs based on these molecules into the marketplace In general, prior research has used patent counts as a measure of innovation (Ahuja and Katila 2001, Jensen 1987, Narin, Noma, and Perry 1987) Although patent counts provide a measure of technical knowledge, patents are at best an incomplete measure of innovation, because patents may or may not translate into actual drugs It might therefore be more appropriate to consider more product-based measures of innovation

An obvious metric at first glance would be the number of new drugs that firms in our sample introduce into the marketplace over time On closer examination, however, this metric is not well suited for our purposes because of the large time lags involved in developing and testing new pharmaceutical products To solve this problem, we use a measure of innovation that is intermediate between patents and actual drug introductions the number of products in Phase 1 trials by each firm in each year (For additional details on this measure of innovation, see Appendix A)

We obtain product information (Phase 1 drugs) from the Pharmaprojects database, which identifies and monitors the progress of all significant new drug candidates as they enter pharmaceutical R&D programs around the world (www pharmaprojects co uk, Snow 1993) New drug candidates are tracked through the various phases of pharmaceutical product development, up to market launch or discontinuation All records are retained in the database, regardless of the fate of the drug The cumulative nature of the database provides a comprehensive history of global drug R&D We were unable to obtain information on product innovation for eight firms, because these firms were themselves acquired by other firms between 1997 and 2003 As such, we dropped them from the analyses

Acquisitions We measure the number of acquisitions in each year for each firm in the sample We obtain this information from *FIS Online*, the electronic version of the *Moody's Manual*, and cross-check it with information from *Financial Times Sequencer* Prior research has often relied on a dichotomous measure of acquisition, whereby a firm is judged to have either acquired one or more firms or not acquired at all (e g , Hitt et al 1991a) By measuring the actual number of acquisitions in each year, we obtain a more refined measure of the impact that knowledge obtained through acquisition has on innovation [1]

Knowledge The field-specific nature of knowledge implies that any measure should address knowledge both within and across fields Therefore, to measure knowledge for a firm properly, we need to identify the specific fields in which the firm possesses knowledge In the pharmaceutical industry, as noted previously, patents are an excellent indicator of firms' technical knowledge Patents have the added advantage that they are classified by the Patent Office as belonging to specific classes that relate to their field of use Therefore, it is possible to identify the technical fields in which a firm has knowledge by studying the classes in which it holds patents

Information on the nature of each patent class is available from the World Intellectual Property Organization The number of approved patents in each patent class for each firm in each year is available from the Delphion database Patent classifications vary in their level of specificity, and the World Intellectual Property Organization uses the following hierarchy of classifications section (most general) → class → subclass → group → subgroup (most specific) An examination of patenting activity within each patent category indicates that the subclass level provides the appropriate level of specificity for our purposes, as there are more than 10,000 subclasses in which firms may have patents Our sample of acquiring firms patented in more than 750 subclasses during the study period, and the targets that these firms acquired patented in 258 subclasses

Depth of knowledge is measured as the average number of approved patents per patent subclass for each firm in each year Breadth of knowledge is measured as the number of patent subclasses covered by each firm's approved patents in each year [2] Similarity in knowledge is measured as the number of patent subclasses shared by the acquirer and target firm, divided by the total number of patent classes owned by the acquirer and target combined [3]

To calculate similarity, we therefore need to identify all the unique patent classes in which both acquirers and targets have approved patents The problem of dealing with a large number of patent subclasses is intensified because many firms acquire more than one target a year, and each of these targets potentially has patents approved in one or more of the full set of patent subclasses We first collect the number of unique patent subclasses for each target for each year across the entire period of our sample We then compute the total number of patent subclasses that each acquirer has in common with each of its targets for three years leading up to the year of acquisition We divide each number by the total number of patent subclasses owned during this period by the parent and each target combined Next, we average across all targets acquired by a firm in a particular year to arrive at a measure of similarity between an acquirer and its targets in each year of the data set

Conceptually, a proper measure of similarity should account for overlap in knowledge not just in the current year but also in previous years One option is to sum data on all patent subclasses for all years for all acquirers and targets before acquisition However, given the potential for knowledge to decay in high-technology industries, similarity in most recent knowledge is likely to be more relevant than knowledge from the distant past. To balance practical constraints with conceptual completeness, we chose a three-year window before acquisition to measure similarity.

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[1] We also tested an alternative metric of knowledge obtained through acquisition by measuring the number of patents granted to each target in the three years leading up to the year of acquisition Our results are robust to this metric

[2] We also tested two alternative measures of breadth entropy $[E = \Sigma_{j=1}^{n} p_j \ln(1/p_j)]$ and the Herfindahl–Hirschman concentration index ($HH = \Sigma_{j=1}^{n} p_j^2$), where $p_j = P_j/P$ is the fraction of the firm's patents in patent subclass j relative to its overall patent portfolio The results using these measures are consistent with those from the simpler and more intuitive measure of breadth we use in the article

[3] We also tested an alternative measure of similarity that does not divide by the total number of patent classes owned by the acquirer and target The results using this measure are consistent with those from the percentage measure of similarity we use in the article

Control variables. To control for the effects of factors beyond those described previously, we include data on additional variables related to both the acquirer and the target. Success or failure of acquisitions is often deemed to be a function of the culture of the firms involved. But culture, like love, is a many-splendored thing. Dimensions of culture could include (1) national culture, (2) organizational culture, (3) market culture, and (4) scientific culture. To control for these dimensions of culture, we include the following variables:

- National culture: We measure whether the target firms have different countries of origin from the acquiring firm, and we sum across all targets in each year for each acquirer.
- Organizational culture: We measure the acquirer's size (measured as the number of persons employed by the firm) and the target's size (measured using the price at which it was acquired).[4]
- Market culture: We measure whether the primary Standard Industrial Classification codes of the target firms are different from that of the parent, and we sum across all targets in each year for each acquirer.
- Scientific culture: We measure the acquirer's biotechnology focus (coded as biotechnology-only or general pharmaceutical).

In addition to these variables, we also include the acquirer's R&D intensity (R&D expenditures divided by sales) and the target's level of technical knowledge before the acquisition (measured as the number of patents received by the target in the preceding three years). We convert the dollar expenditures and sales figures for each year into constant 1982–1984 dollars by multiplying them by the appropriate inflation indices.

Model Specification

We seek to fulfill multiple objectives in our model specification. First, the model should enable us to estimate not only the current effects of internal and external knowledge on innovation but also their future effects in the years following the acquisition. This requirement allows for a more complete assessment of the true impact of acquisitions on innovation, because the effects of current knowledge (whether internal or external) on future innovation could last for many years.

Second, the model should account for heterogeneity due to firm-specific effects. Unobserved factors other than those explicitly addressed in our conceptual framework can also have an impact on innovation. For example, it could be that some firms tend to view innovation as the overriding goal of acquisitions, whereas innovation may be just one of many goals of other firms. Such goals are difficult to assess and are unobserved by the econometrician. Other examples of unobserved firm-specific variables include alliance-proneness, licensing arrangements, and quality of management. To parcel out the true effects of our hypothesized variables properly, we need to control for these unobserved effects.

To fulfill these objectives, our analysis combines an error-component regression model with a Koyck distributed-lag specification. As such, we assume that the effect of knowledge decays exponentially (Pakes and Schankerman 1984; Schott 1976, 1978; for an alternative viewpoint, see Madhavan and Grover 1998). The panel structure of our data enables us to use an error-component model that controls for unobserved firm-specific heterogeneity (Baltagi 2001). Our distributed-lag specification enables us to represent parsimoniously the effects of prior internal and external knowledge on innovation.

To obtain efficient and unbiased estimates of the future effects of current knowledge without a distributed-lag specification, we would need an infinite (or at least a very large) number of lags of data on the independent variables (Intriligator, Bodkin, and Hsiao 1996). Practically, such an estimation procedure creates severe problems with multicollinearity among the lagged knowledge terms. Our modeling challenge is similar to that faced by researchers attempting to model the effect of advertising on sales. There too, the key independent variables (advertising in that case, and knowledge in ours) could have effects not only in the current period but also in future periods. (For a classic exposition of this issue in marketing, see Clarke 1976; for a recent application, see Tellis, Chandy, and Thaivanich 2000.) The problem of multicollinearity is especially severe when key hypotheses revolve around the interaction effects, as is the case here.

A distributed-lag model, however, alleviates the need for and the problems caused by numerous lags on knowledge. Moreover, this specification provides an intuitive metric of the rate of decay of knowledge, thus enabling a calculation of the impact of current internal and external knowledge on innovation in future periods. An analysis of various lag specifications using our data indicates that a simple Koyck model (with its associated exponential decay pattern for knowledge) fits the data best. This specification is consistent with a long tradition of research in the advertising and investments areas (see Clarke 1976; Koyck 1954) and with other recent studies of innovation and knowledge (e.g., Dutta, Narasimhan, and Rajiv 1999).

We use the following model specification to test our hypotheses (for the model derivation, see Appendix B):

$$
\begin{aligned}
(1)\qquad I_{it^*} = {} & \beta_0 + \lambda I_{i,t^*-1} + \beta_1 \text{Depth}_{i,t} + \beta_2 \text{Breadth}_{i,t} \\
& + \beta_3 \text{Acquisition}_{i,t} + \beta_4 (\text{Acquisition} \times \text{Depth})_{i,t} \\
& + \beta_5 (\text{Acquisition} \times \text{Breadth})_{i,t} + \beta_6 \text{Similarity}_{i,t} \\
& + \beta_7 \text{Similarity}^2_{i,t} + \Pi \text{Control}_{i,t} + \mu_i + \gamma_t + \upsilon_{i,t}.
\end{aligned}
$$

The element I_{it^*} refers to the innovation output of firm i in year t*, where $t^* = t + n$ $(n \geq 0)$, and Acquisition, Depth, Breadth, and Similarity are defined in Table 1. For the reasons noted in Appendix A, we set n = 4 when estimating Equation 1 Control$_{i,t}$ is a matrix of control variables, μ_i and γ_t are the firm-specific and time-specific effects, and $\upsilon_{i,t}$ is the remaining error term

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[4] We also measured target size using number of employees, sales, net income, and assets. Data on these measures were more difficult to find for our entire sample. For the subsample for which we have data on these measures, we find that acquisition price correlates highly with each of the other measures of target size (all correlations > .78, $p < .001$).

Our dependent variable, innovation, is a count variable, and therefore it might be argued that it is appropriate to use a nonlinear (Poisson or negative binomial) specification to test our hypotheses However, such an approach is not straightforward in our context Estimation techniques that simultaneously account for (1) count data, (2) a lagged dependent variable, and (3) panel data are still in their infancy (see Windmeijer 2002) Recently, some of the pioneers in this area of econometrics (see Blundell, Griffith, and Windmeijer 2002, Windmeijer 2002) have developed a generalized method of moments (GMM) estimator that meets all three requirements

Accordingly, we employed a GMM, quasi-differenced, linear feedback model to estimate the effects of the variables in Equation 1 The model diagnostics indicate that our specification is appropriate, that is, the hypothesis that our instrument set is valid cannot be rejected at the $p <$ 10 level (Sargan statistic $\chi^2(13)$ = 11 89, p = 53) In addition, the pattern of serial correlation in the first-differenced residuals is consistent with the assumption of these models that the u_{it} disturbances are serially uncorrelated, that is, the Δu_{it}s have a significant and negative first-order correlation (M1 = –2 01, $p <$ 10) and no significant second-order correlation (M2 = 1 23, $p <$ 10) (Bond 2002) Thus, overall, the null hypothesis that our moment conditions are valid cannot be rejected at the $p <$ 10 level (Blundell, Bond, and Windmeijer 2000) Finally, the results from the GMM estimation are similar to the more standard generalized least squares estimation results we report subsequently However, the interpretation of interaction effects is difficult in nonlinear GMM models because marginal effects are a function of all independent variables, not just the variables in the interaction term (see Ai and Norton 2001, 2003) This problem of interpretation is compounded by the presence of a large number of independent variables Moreover, the error distribution associated with the interaction parameters in the nonlinear specification is unknown (see Ai and Norton 2001, 2003), thus, the standard errors and significance levels of the interaction parameters are not available Therefore, we report results from the more traditional random-effects generalized least squares estimator (Baltagi 2001) in the next section

Results

Table 2 presents the descriptive statistics for the variables of interest Table 3 presents the estimation results with the number of Phase 1 products developed by the acquirer as the dependent variable We test three models Model 1 tests the effect of external knowledge only, Model 2 tests the effect of internal knowledge only, and Model 3 tests the effect of both internal and external knowledge Model 3 therefore presents the estimates for our model in Equation 1

We run three models to show the importance, as we argued previously, of examining the effect of internal and external knowledge acting together as opposed to separately As the results show, our hypothesized model (Model 3) outperforms Models 1 and 2 The R^2 increases from 46 (Model 1) and 49 (Model 2) to 56 (Model 3), an increase of 22% and 14%, respectively (see Table 3) These increases are all statistically significant at the $p <$ 001 level

The λ coefficient is positive and significantly different from zero in all models, indicating that the effect of knowledge on innovation continues into future periods The estimate of this decay parameter in the fully specified models (λ = 19, $p <$ 01) can be used to compute the long-term impact of each component of knowledge using the following formula

$$\text{Long term effect of } \beta_i = \beta_i/(1 - \lambda)$$

We next describe the results for each of our hypotheses and focus only on the results of the estimation of our hypothesized model (Model 3)

Depth of Knowledge and Innovation

H_1 argues that firms with high depth of knowledge produce more innovations than do firms with low depth of knowledge The coefficient of depth of knowledge is significant

TABLE 2
Descriptive Statistics by Firm

	1	2	3	4	5	6	7	8	9	10	11
1 Innovation Phase 1 products	1 00										
2 Acquisitions	18	1 00									
3 Depth	46	01	1 00								
4 Breadth	57	21	66	1 00							
5 Similarity	15	21	– 01	04	1 00						
6 R&D intensity	– 10	– 03	– 11	– 11	– 03	1 00					
7 Parent size	59	26	50	79	04	– 11	1 00				
8 Biotechnology	– 46	– 28	– 63	– 85	– 06	12	– 80	1 00			
9 Target technical knowledge	15	25	01	09	81	– 02	13	– 11	1 00		
10 Target value (millions of dollars)	22	13	41	46	03	– 05	32	– 36	05	1 00	
11 Nonpharmaceutical targets	26	61	19	25	08	– 09	24	– 33	07	24	1 00
12 Foreign targets	13	59	08	12	– 02	– 07	15	– 29	10	01	57
Mean	1 26	47	2 41	6 32	01	3 14	29441	75	3 05	398 14	38
Standard deviation	1 91	95	2 63	8 75	04	13 61	58742	43	7 98	1124 68	86

TABLE 3
Effect of Internal and External Knowledge on Product Innovation by Acquirer

Independent Variable	Model 1: External Only	Model 2 Internal Only	Model 3: Internal and External
Intercept	– 23 (41)	–1 18*** (50)	–2 69*** (62)
Innovation$_{t^*-1}$	32*** (06)	24*** (06)	19*** (07)
Acquisitions$_t$	02 (16)	—	– 02 (17)
Depth$_t$	—	12*** (05)	11** (05)
Acquisitions$_t$ × Depth$_t$	—	—	12*** (05)
Breadth$_t$	—	06*** (02)	09*** (02)
Acquisitions$_t$ × Breadth$_t$	—	—	– 02 (01)
Similarity$_t$	—	—	40 41** (18 81)
Similarity$_t^2$	—	—	–263 07** (130 67)
R&D Intensity$_t$	–2 40 × 10^{-3} (006)	–2 27 × 10^{-3} (006)	–1 19 × 10^{-3} (006)
Parent Size$_t$	3 43 × 10^{-5}*** (9 × 10^{-6})	2 72 × 10^{-5}*** (9 × 10^{-6})	3 65 × 10^{-5}*** (9 × 10^{-6})
Biotechnology$_t$	54* (41)	1 33*** (47)	2 68*** (57)
Target Technical Knowledge$_t$	– 01 (02)	—	– 05* (03)
Target Value$_t$	2 20 × 10^{-4}** (1 1 × 10^{-4})	—	–2 54 × 10^{-5} (1 2 × 10^{-4})
Nonpharmaceutical Targets$_t$	14 (19)	—	16 (21)
Foreign Targets$_t$	18 (14)	—	29** (15)
R^2 overall	46	49	56
Wald χ^2	133 04	151 39	185 90

*$p < 10$
**$p < 05$
***$p < 01$

Notes Standard errors are in parentheses Dependent variable = number of drugs in Phase 1 trials per firm per year Number of observations = 162

and positive in Model 3 ($\beta = 11$, $p < 05$) (see Table 3) Therefore, in support of H_1, the greater the acquirer's depth of knowledge, the greater is its innovation output

H_2 suggests that firms with high depth of knowledge derive more innovations from acquisitions than do firms with low depth of knowledge In other words, the hypothesis predicts a positive interaction effect of number of acquisitions and depth of knowledge Our results support this hypothesis

For the sake of exposition, we next present some simple results from a bivariate categorical analysis of the interaction effect of depth of knowledge and acquisitions on innovation Table 4 reports the results using median splits of acquirers based on their number of acquisitions and depth of knowledge Firms that are high in both depth of knowledge and the number of acquisitions appear to produce the most innovations The formal analysis in Table 3 confirms this result The coefficient of the interaction term of depth and acquisitions in Table 3 is significant and positive in Model 3 ($\beta = 12$, $p < 01$) This result suggests that the marginal impact of acquisitions on innovation is greater for firms with high depth of knowledge than for other firms

Breadth of Knowledge and Innovation

H_3 argues that high breadth of knowledge leads to greater innovation than low breadth of knowledge The coefficient of breadth of knowledge is significant and positive in Model 3 ($\beta = 09$, $p < 01$) (see Table 3) Thus, in strong support of H_3, the greater the acquirer's breadth of knowledge, the greater is its innovation output

H_4 suggests that firms with high breadth of knowledge derive more innovations from acquisitions than do firms with low breadth of knowledge In other words, the hypothesis predicts a positive interaction effect of number of acquisitions and breadth of knowledge Table 5 reports the results using median splits of firms based on their number of acquisitions and breadth of knowledge Firms that are high in both breadth of knowledge and the number of acquisitions appear to produce the most innovations However, the formal results in Table 3 do not support this hypothesis The coefficient of the interaction term of breadth and acquisitions is not significantly different from zero in Model 3 ($\beta = – 02$, $p = 13$)

TABLE 4
Mean Number of Products in Phase 1 Trials for Firms with High Versus Low Acquisitions and High Versus Low Depth of Knowledge

	Low Depth	High Depth
Low acquisitions	2 4	4 8
High acquisitions	2 5	13 9

TABLE 5
Mean Number of Products in Phase 1 Trials for Firms with High Versus Low Acquisitions and High Versus Low Breadth of Knowledge

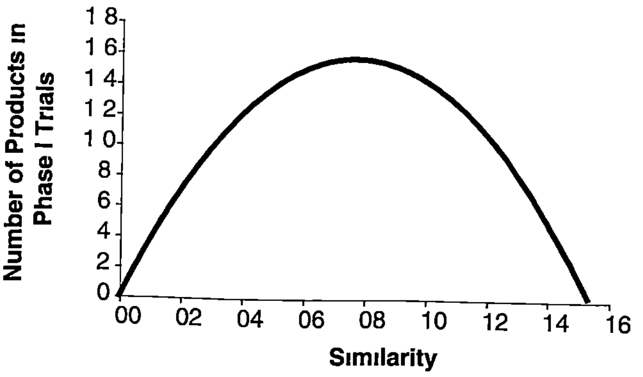
	Low Breadth	High Breadth
Low acquisitions	2 6	5 0
High acquisitions	2 0	12 8

It is possible that the nonsignificant coefficient of the breadth × acquisitions interaction is due to multicollinearity among our breadth, acquisitions, and depth variables. To assess whether multicollinearity is the true cause of this result, we carry out five sets of analyses. First, we estimate the variance inflation factor for the breadth and depth variables and their interactions with acquisitions in our model. The variance inflation factor statistics for these variables are all well below the acceptable cutoff of 10. Second, using the condition index method (Belsley, Kuh, and Welsch 1980), we find the condition number to be 13.45, well below the cutoff of 30 (all singular values except one are below 10). Third, we reestimate Model 3 using Lance's (1988) method after we correct for multicollinearity due to interaction terms. The coefficient remains nonsignificant, indicating that multicollinearity between the main and interaction effects is not the cause of this result. Fourth, we test alternative functional specifications of breadth (e.g., by using a squared breadth term to test for curvilinear effects). The analyses do not provide support for such alternative specifications. Fifth, we check if the main and interaction effects of breadth hold when the main and interaction effects of depth are dropped, and vice versa. They do. In summary, these analyses indicate that multicollinearity does not drive our results.

Similarity of Knowledge and Innovation

H_5 suggests that acquirers with knowledge that is moderately similar to that of their targets produce more innovations after acquisitions than do acquirers with knowledge that is very similar to or very different from that of the targets. In Model 3, the coefficient of similarity is significant and positive ($\beta = 40.41$, $p < .05$), and the square of similarity is significant and negative ($\beta = -263.07$, $p < .05$) (see Table 3). The results provide support for H_5 and, taken together, imply that the overall effect of similarity is curvilinear. Figure 1 depicts the predicted effect of similarity based on the model coefficients reported in Table 3. All our data points except one fall within the range of similarity values depicted in Figure 1. As the figure indicates, increasing similarity first increases and then decreases the innovation activity of the parent firm.

FIGURE 1
Predicted Effect of Similarity on Product Innovation



Additional Analyses

Relative importance of depth versus breadth. The results described previously indicate that depth and breadth of knowledge have significant effects on innovation. To identify the relative effects of depth and breadth on innovation, we also compute the standardized coefficients of these variables. A comparison of the standardized coefficients shows that breadth has a greater impact on innovation than depth does ($\beta_{\text{breadth}} = .45$ versus $\beta_{\text{depth}} = .16$). Furthermore, as Table 2 indicates, the effect size as captured by the Pearson correlation (see Fern and Monroe 1996; Sawyer and Ball 1981) between breadth and innovation is higher than that between depth and innovation (.57 versus .46). It appears that breadth, more than depth, promotes flexibility and adaptability (Volberda 1996), as well as the ability to combine diverse types of knowledge (see Henderson and Cockburn 1994; Pisano 1994), thus leading to greater innovation.

Process checks. An implicit argument in our hypotheses on the role of internal knowledge on innovation through acquisition is that firms with greater internal knowledge choose better targets. To test the validity of this claim, we conduct process checks on the relationship between acquirers' knowledge and the quality of the targets they acquire. Specifically, we conduct additional analyses to address whether firms with greater depth and breadth of knowledge acquire targets that (1) have greater knowledge and (2) have more significant knowledge.

First, to assess whether firms with greater internal knowledge choose targets that have greater knowledge, we compare the average number of patents per target for acquirers with high versus low depth and breadth of knowledge (see Figures 2 and 3). We classify acquirers as low or high in depth and breadth of knowledge using a median split on the depth and breadth of patents granted to these firms over the sample period. Figures 2 and 3 show that acquirers with high levels of depth and breadth of knowledge acquire targets with higher patents on average than do acquirers with low depth and breadth, respectively (7.15 versus .87 and 7.32 versus .70, respectively, $p < .05$).

Second, to assess whether firms with greater internal knowledge choose targets that have more significant knowledge, we compare the average number of forward citations per patent per target acquired by firms with high versus low depth and breadth of knowledge. As in academic articles, forward citations provide a reasonable measure of the significance of a particular patent, because they indicate how many other patents cited this patent in their reference list. (For a similar use of this measure in the patents context, see Dutta, Narasimhan, and Rajiv 1999; Hall, Jaffee, and Trajtenberg 2000.) Figures 4 and 5 show that acquirers with high levels of depth and breadth of knowledge acquire targets with higher forward citations per patent per target than do acquirers with low depth and breadth, respectively

FIGURE 2
Average Patents per Target Acquired by Acquirers with High Versus Low Depth of Knowledge

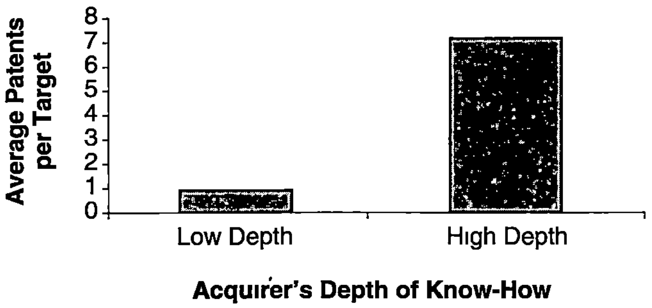
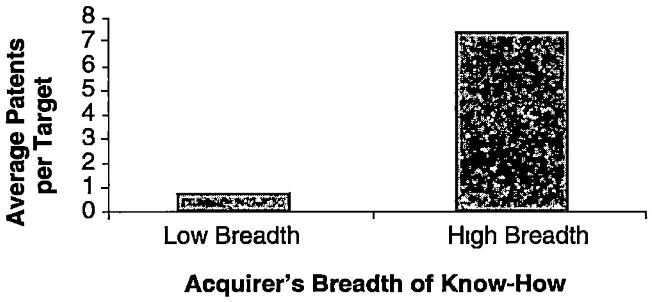


FIGURE 3
Average Patents per Target Acquired by Acquirers with High Versus Low Breadth of Knowledge



(53 74 versus 12 96 and 54 09 versus 9 47, respectively, $p <$ 05 for both)

Endogeneity It is possible that depth, breadth, and acquisitions are themselves endogenous with respect to acquirer variables such as R&D and size Moreover, breadth of knowledge could itself be a function of depth, and vice versa To check for potential effects of endogeneity, we test a three-stage least squares (3SLS) specification that treats depth, breadth, and acquisitions as endogenous, that is, dependent on one another as well as on various control variables such as R&D and firm size The pattern of results is similar to those from the panel model we report in Table 3 More formally, the Hausman coefficient (m) for the comparison of the coefficients of the 3SLS model with the panel model is $\chi^2(15) = 3\ 95$ ($p =$ 97), thus, the test fails to reject the null hypothesis that the difference in coefficients is not systematic In other words, endogeneity does not cause problems with the consistency of our parameter estimates The panel data model we use in the article is consistent and efficient, whereas the 3SLS model is consistent but inefficient (see Pindyck and Rubinfeld 1991)

Heterogeneity in slopes The model in Equation 1 corrects for unobserved heterogeneity through error decomposition It does not, however, correct for heterogeneity in slopes If, for example, companies that acquire large targets are less capable of leveraging acquisitions into innovation than companies that acquire small targets, such heterogeneity could be problematic To account for potential heterogeneity in our key variables, we run random coefficients models that allow the coefficients for our hypothesized variables to vary randomly We find some evidence for heterogeneity in the effect of depth on innovation This suggests that though the effects of depth are positive for the average firm, some firms may experience a negative effect of depth on innovation In general, however, the results of this analysis are consistent with those for the error decomposition model we report in the article

Discussion

This article highlights two sources of knowledge internal and external Internal knowledge by itself can drive innovation in future periods, but internal knowledge also has another, more subtle benefit Deep internal knowledge provides firms with a superior ability to generate innovations from external sources such as acquisitions

FIGURE 4
Average Forward Citations per Patent per Target Acquired by Acquirers with High Versus Low Depth of Knowledge

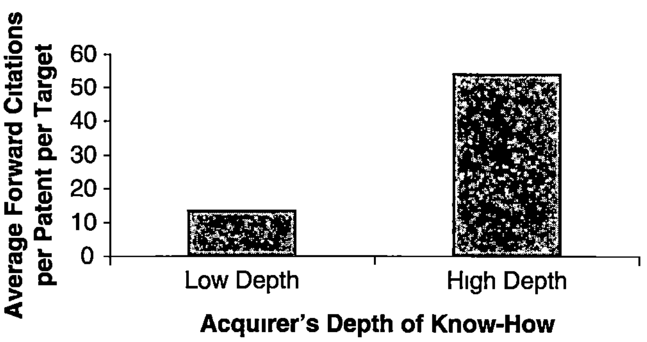
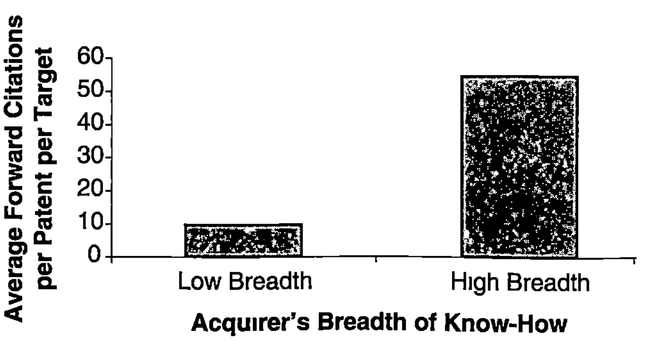


FIGURE 5
Average Forward Citations per Patent per Target Acquired by Acquirers with High Versus Low Breadth of Knowledge



The results support our central argument that the innovation outcomes of acquisitions are driven by the preacquisition knowledge of the acquirer and its similarity with the targets' knowledge We find a strong interaction effect of the depth of the acquirer's existing knowledge and that of its acquisitions on innovation output We also find that moderate similarity leads to greater postacquisition innovation than does either low or a high similarity between the acquirer's and the target's preacquisition knowledge Therefore, for firms with appropriate internal knowledge and fit, acquisitions can act as a tonic for innovation However, when we control for firms' internal knowledge, we find that acquisitions on their own act as a placebo, that is, they have no effect on firms' postacquisition innovation output ($\beta_{\text{acquisition}} = -02$, $p >$ 10, see Table 3)

Implications for Research

An important theoretical contribution of our article is that it sheds more light on the nature of knowledge and its role in innovation We show how firms' internal knowledge interacts with external knowledge gained through acquisitions to foster innovation Thus, our theoretical perspective enables us to reexamine the impact of acquisitions on innovation, this in turn enables us to empirically extend, clarify, and correct some of the conclusions of prior research

First, in general, prior research on innovation has focused on how internal knowledge influences innovation within the firm In contrast we examine how, over time, both internal and external knowledge interact to influence innovation Specifically, we observe whether acquisitions as a source of external knowledge lead to positive, negative, or no gains in innovation to acquiring firms The limited research that has examined the influence of acquisitions on innovation has generally suggested and found that this influence is negative (Ernst and Vitt 2000, Hitt et al 1991a, Miller 1990) We argue that the opposite is more likely, especially in industries in which firms undertake acquisitions with the express intention to boost innovation by gaining external knowledge By including both large and small firms in our sample, examining lagged effects, and controlling for firm-specific effects, we show that acquisitions can increase innovation in such contexts

Second, prior research on acquisitions and innovation tends to focus on postacquisition integration activities In contrast, we control for such firm-specific effects and focus on the knowledge that acquiring firms bring to the acquisition We then examine how the depth, breadth, and similarity of knowledge influence postacquisition innovation Relatedly, prior research on knowledge has mainly speculated on the processes by which knowledge is created in firms There has been much discussion of how firms learn, their absorptive capacity, and the factors influencing learning and absorption (see Cohen and Levinthal 1989, Zahra and George 2002) Limited empirical research has tested these ideas, and to our knowledge, none has examined them in the context of acquisitions We contribute to this literature by showing that absorptive capacity is particularly critical to the successful acquisition and use of external knowledge Firms that have greater absorptive capacity because of their existing internal knowledge are better at choosing and integrating external knowledge and using it to create still newer knowledge

Third, prior research has argued for a positive linear effect of similarity between the knowledge of the acquirer and that of the target (see Singh and Montgomery 1987, for an exception, see Ahuja and Katila 2001) In contrast, we argue for and show a nonlinear effect of similarity in knowledge on postacquisition innovation Specifically, firms that have a moderate amount of similarity with targets' knowledge gain more from acquisitions than do firms whose knowledge is very similar to or very different from the knowledge of targets

Implications for Firms

This article has several recommendations for firms involved in acquisition activity First, the article suggests two independent routes to increased innovation firms can either concentrate on building internal knowledge or buy it through acquisitions Acquisitions offer acquiring firms access to knowledge that they may not otherwise have and that might combine with their internal knowledge to boost innovation Independent of acquisition, however, building knowledge offers firms greater ability to use past knowledge to develop new knowledge and thus boost innovation Moreover, it is not just the amount of internal knowledge that matters, rather, it is the type of knowledge Firms with depth and breadth of internal knowledge are less likely to suffer from lockout (Leonard-Barton 1995), they have greater combinative capabilities (Kogut and Zander 1992), and they can use prior know-how to learn through both exploration and exploitation (Bierly and Chakrabarti 1996, March 1991) The article's results also suggest that breadth and depth have different magnitudes of impact on innovation The impact of breadth is higher than that of depth An excessive focus on deepening knowledge in an area could be counterproductive if it comes at the expense of breadth Breadth of knowledge may promote flexibility, adaptability, and the ability to combine diverse types of knowledge (see Henderson and Cockburn 1994, Pisano 1994, Volberda 1996) Furthermore, the product scope that breadth provides also ensures the greater likelihood of serendipity and happy accidents, both of which are important drivers of product innovation (Helfat and Raubitschek 2000)

Second and more important, the article suggests that the two strategies of acquisitions and developing internal knowledge lead to even greater innovation when pursued in tandem Despite the pessimism of many academics, some industry observers recognize the competitive advantages that can be derived from acquisitions For example a *Wall Street Journal* article (O'Boyle 1988, p 26) on the German chemical company Bayer's reluctance to engage in acquisitions quotes an industry expert, Michael Eckstut, as saying that though "Bayer has had a phenomenal record over the last few years, doing things internally can sometimes carry a higher risk than acquisitions" Eckstut also warned that "companies that preclude acquisitions as a way of obtaining new skills and resources run the risk of losing leadership because they are too introverted"

Firms that first develop deep internal knowledge have greater absorptive capacity, this enables them to choose and leverage external knowledge better Indeed, successful firms appear to recognize this point For example, in its annual report, Johnson & Johnson (1996, p 4), one of the innovative firms in our sample, notes that "while internal development is our preferred source of growth, we view selective acquisitions as an appropriate mechanism for supplementing our efforts"

Third, it is not merely the amount of knowledge that the acquirer brings to the acquisition that drives its postacquisition innovation The similarity of its knowledge with that of the target is crucial too (Richardson 1972) Differences in the nature of firms' knowledge can be considerable even within industries, and they can significantly affect the success of acquisitions To gain the most from acquisitions, acquiring firms should ensure that their internal knowledge is neither too close nor too far removed from that of the target firm

Finally, in contrast to prior research, which typically emphasizes the similarity between the markets in which parent and target operate (e g , Singh and Montgomery 1987), the national origins of the two firms (e g , Harzing 2002), and their relative size, we emphasize the importance to acquirers of assessing the fit in their knowledge with that of targets We show that when similarity of knowledge is taken into account, other, more conventional measures of similarity have a less significant impact on postacquisition innovation Of these, we find that only country of origin has a significant influence on innovation beyond the effects of similarity in knowledge we propose The size of the target and its market similarity with the acquirer matter less This suggests that in contexts in which innovation is an important strategic objective, acquiring firms should identify and choose targets on the basis of their fit in knowledge over other aspects of similarity

Limitations and Further Research

Acquisitions are a complex phenomenon, and ours is by no means the last word on the topic Our research has several limitations, some of which offer possibilities for further research First, as in any early empirical endeavor, we have had to maneuver carefully between the Scylla of model misspecification and the Charybdis of model overparameterization We cannot, within one study, exhaustively examine the many types of internal and external knowledge

When studying internal knowledge, we examine the knowledge contained in patents Patents are a widely used measure of knowledge in research across a range of high-tech industries pharmaceuticals (Cockburn, Henderson, and Stern 1999), semiconductors (Dutta, Narasimhan, and Rajiv 1999), chemicals (Ahuja and Katila 2001), robotics (Katila and Ahuja 2002), and the industrial machinery industry in general (Arundel and Kabla 1998, Cockburn and Griliches 1988) Nevertheless, in some industries, important sources of knowledge may be difficult to codify, and future researchers on these industries may wish to employ other measures of such knowledge Acquiring firms may also sometimes gain patents but not necessarily additional knowledge from their targets Some patents may eventually manifest themselves as product innovations and thus artificially inflate the correlations between our dependent variable (innovation) and our independent variables (which are patent based) Fortunately, in the pharmaceutical industry, few patents end up becoming product innovations (DiMasi, Hansen, and Grabowski 2003), as such, this inflation is likely to be very small Similarly, when studying external knowledge, we examine the knowledge obtained through acquisitions Again, although acquisitions are an important source of external knowledge, other sources of such knowledge, such as alliances and interfirm cooperation, exist and are worthy of attention (see, e g , Rindfleisch and Moorman 2001)

Second, we examine only one, albeit important, type of knowledge, namely, technical knowledge The role of other types of knowledge—for example, knowledge related to consumers and competitors—also merits study (see Capron and Hulland 1999, Li and Calantone 1998, Moorman and Rust 1999) In this article, we attempt to capture the effects due to other sources of internal and external knowledge by accounting for firm-specific heterogeneity, as well as by using important control variables Nevertheless, this remains an empirical solution To gain a more complete theoretical picture, future researchers may wish to employ more explicit and fine-grained measures of other sources of internal and external knowledge than the ones we use here Third, we use data that are at the yearly level of aggregation As such, our model may overestimate the decay parameter (λ) in Equation 1 (Clarke 1976) More disaggregate data will allow for a more accurate assessment of the decay parameter Fourth, our model assumes that the effect of knowledge decays exponentially Although this assumption is in line with the bulk of the literature (Dutta, Narasimhan, and Rajiv 1999, Pakes and Schankerman 1984, Schott 1976, 1978), other researchers posit that knowledge can appreciate over time (see Madhavan and Grover 1998) More disaggregate data would enable the application of other, more flexible functional forms of the lag specification

Finally, we study only one, albeit important, industry pharmaceuticals The choice of a single industry is critical in ensuring internal validity because the appropriate measures of knowledge can be quite different across industries The pharmaceutical industry is especially suited to our use of patents as a measure of knowledge Choosing one industry, however, also raises the issue of generalizability The pharmaceutical industry is unique in many ways, but it is possible to make at least some tentative generalizations from pharmaceuticals to other high-tech industries Indeed, we are not alone in this belief (see also Bierly and Chakrabarti 1996, Cockburn, Henderson, and Stern 1999, Shankar, Carpenter, and Krishnamurthi 1998) Nevertheless, other industries in which patenting is less common might require other measures of knowledge, and further research would benefit from an exploration of such empirical contexts

Conclusion

A successful innovation strategy requires a judicious combination of internal and external sources of knowledge Acquisitions provide a means to access external knowledge that can be difficult or even impossible to create through internal sources. For this reason, firms may not want to rely solely on internal sources of knowledge, but they may not want to rely solely on external sources either. We show that in the context of acquisitions, the two sources of knowledge—internal and external—interact in a dynamic fashion to produce innovations.

Acquisitions need not be a poison pill or even merely a placebo for innovation. For firms that first engage in internal knowledge development, the knowledge-based view of innovation we present in this article suggests just the opposite. Acquisitions can be a tonic for innovation.

Appendix A
Measuring Innovation

Though conceptually ideal, the number of new drugs that firms introduce into the marketplace over time is not empirically well suited for our purposes, mainly because of the large time lags involved in developing and testing new pharmaceutical products. After their synthesis and extraction, new drugs must go through preclinical and clinical trials and a process of Food and Drug Administration (FDA) approval before they are introduced into the market (Mathieu 2000). The average time in the 1990s for preclinical trials alone was 6 years (FDA 1999). The three phases of the clinical trials that follow took, on average, up to several months for Phase 1, several months to 2 years for Phase 2, and between 1 and 4 years for Phase 3. Finally, the process of FDA approval took, on average, another 1.5 years. As a consequence, the time from conception to product introduction in the pharmaceutical industry in the 1990s was frequently more than a decade. Given these large lags and the many intervening factors that come into play during this time, it is extraordinarily difficult to tie empirically the knowledge generated from individual acquisitions to all the future drug introductions that result from this knowledge.

To solve this problem, we use the number of products in Phase 1 trials by each firm in each year as our measure of innovation. This measure has several strengths. First, we cannot use approved products because of the time lags involved, so this is the next-best choice of a measure that goes beyond patents in being product based but nevertheless involves manageable lags. On the basis of information (FDA 1999; Mathieu 2000) on the average time from idea development to Phase 1 trials, we examine Phase 1 products four years after the year of acquisition.

Second, the measure correlates well with actual drug introductions. To confirm the link between Phase 1 trials and actual product approvals empirically, we calculated the correlation between the number of Phase 1 drugs of firms in our sample in 1996, 1997, and 1998 and the number of approved products in 2001. The correlations were all significant and positive ($\gamma_{1996} = .76$, $p < .0000$; $\gamma_{1997} = .40$, $p < .05$; and $\gamma_{1998} = .51$, $p < .01$, respectively).

Third, the measure is financially important because it is likely to correspond strongly with the stock market performance of the firm. Again, this is not surprising, given the relationship between drugs in Phase 1 and actual introductions. To confirm this intuition empirically, we collected data on the market valuation of the firm in each year in our sample. We find that the correlation between the number of Phase 1 drugs of firms in our sample in a particular year and market capitalization of the firms in that year is positive and significant ($\gamma = .45$, $p < .0000$).

Appendix B
Derivation of Empirical Model

Here, we derive our model specification. Let the relationship between knowledge and innovation for firm i at time t be represented as follows:

$$\text{(B1)} \quad I_{i,t} = \alpha_0 + \beta_0 K_{i,t} + \beta_1 K_{i,t-1} + \beta_2 K_{i,t-2} + \cdots + \varepsilon_t,$$

where I = innovation, and K = knowledge. Assume that (1) the effect of current knowledge on future innovation declines exponentially and (2) a real number λ measures the decay (or appreciation) of knowledge from year to year. Then, Equation B1 reduces to

$$\text{(B2)} \quad I_{i,t} = \alpha_0 + \beta\lambda^0 K_{i,t} + \beta\lambda^1 K_{i,t-1} + \beta\lambda^2 K_{i,t-2} + \cdots + \varepsilon_t.$$

A Koyck transformation on Equation B2, which involves lagging Equation B2 by one period, multiplying by λ, and subtracting from the original Equation B2, results in

$$\text{(B3)} \quad I_{i,t} = \alpha + \lambda I_{i,t-1} + \beta K_{i,t} + v_t,$$

where $\alpha = (1 - \lambda)\alpha_0$, and $v_t = \varepsilon_t - \lambda\varepsilon_t$.

Next, we model the components of knowledge as follows:

$$\text{(B4)} \quad K_t = f(\text{Internal, External, Synergy}),$$

where

Internal = *f*(Depth, Breadth),
External = *f*(Acquisition), and
Synergy = *f*(Depth × Acquisition, Breadth × Acquisition, Similarity).

Thus, Equation B4 reduces to

$$\text{(B5)} \quad K_t = f(\text{Depth, Breadth, Acquisition, Depth} \times \text{Acquisition, Breadth} \times \text{Acquisition, Similarity}).$$

Substituting a linear specification of Equation B5 in Equation B3 and allowing for firm-specific and time-specific heterogeneity and an n-year lag between innovation and knowledge, we obtain Equation 1 (specified in the method section), which we use to test our hypotheses.

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Jill G. Klein & Rohini Ahluwalia

Negativity in the Evaluation of Political Candidates

Prior research has demonstrated a clear negativity effect (greater weighting of candidate weaknesses compared with strengths) in the evaluation of U S presidential candidates in each of the past six elections analyzed The authors adopt a motivational view and question the robustness of this finding They reanalyze past National Election Studies data along with new data and conclude that the negativity effect is not universal across voters, it is a robust effect only for voters who dislike the candidate They argue that previous findings are due to aggregation of data across voters who vary in their motivations

Millions of dollars are spent marketing political candidates during each election year An increasing percentage of these dollars is spent on negative campaigning (Ansolabhere and Iyengar 1995, Devlin 1993, Lau and Sigelman 1998) because of the belief that negative information about political candidates is more influential than positive information in swaying voter preferences (Aragones 1997, Bunker 1996, Johnson-Cartee and Copeland 1991, Klein 1991, 1996, Lau 1985, Pinkleton 1997) Consistent with this belief, media gurus often give negative news quadruple weight compared with positive news (as specified by the Merriam formula used to compute media impact, Kroloff 1988) It is because of this firm belief in the weight of negative information that political pundits continue to advocate its use, despite recent data that demonstrate that negativity in political campaigning disenfranchises voters and could lead to low voter turnout and involvement (Ansolabhere and Iyengar 1995)

The belief in the power of negative campaigning has its roots in impression formation studies conducted in the 1980s (e g , Anderson 1981, Fiske 1980), which demonstrated a robust negativity effect—the greater weighting of negative compared with equally extreme positive information in the formation of overall evaluations—in a laboratory context This belief gained wider acceptance in political marketing because of multiple case studies that supported it (e g , the 1988 come-from-behind victory of George H W Bush) and empirical studies that demonstrated a negativity effect in the evaluation of presidential candidates (e g , Klein 1991, 1996, Lau 1985) The latter stream of research consists of studies that analyzed voter interviews available through the American National Election Studies (NES) database for six past Presidential elections (1972, 1976, 1980, 1984, 1988, and 1992) and demonstrates a clear negativity effect for both the winning and the losing candidate in each election

In the political domain, these studies have led to the conclusion that however popular the presidential candidate, his negatives matter more than his positives to the public, which in turn lends support to the adage that people do not vote for but against candidates (e g , Ansolabhere and Iyengar 1995, Aragones 1997, Bunker 1996) These results also matter to marketers because they provide the strongest unchallenged source of "real" (as opposed to laboratory) data available in support of the negativity effect and have spurred an increase in the amount of negative product-related advertising (*Business Marketing* 1992) Recent theorizing in marketing and social psychology (e g , Ahluwalia, Unnava, and Burnkrant 2001) raises questions about the prevalence of a negativity effect Specifically, whereas the negativity effect in political candidate evaluations is consistent with the perceptual figure-ground explanation of negativity (e g , Fiske 1980), it is inconsistent with recent motivational explanations of information processing (e g , Ahluwalia 2002, Ditto et al 1998, Till and Shimp 1998), as well as with recent political events (e g , high Bill Clinton evaluations during the Clinton–Monica Lewinsky affair, the defeat of the more aggressively mudslinging Bush and Bob Dole in 1992 and 1996, respectively) Moreover, we believe that the increasing proportion of marketing dollars claimed by negative campaigning (West 1993) and its deleterious effects on voter turnout signal that the time has come to reassess the likelihood of a negativity effect in the evaluation of political candidates

Conceptual Foundation

The Perceptual Figure-Ground Explanation

The most well-accepted explanation for the negativity effect in the political domain is the perceptual figure-ground theory (or salience explanation, Fiske 1980, Klein 1991), which is based on the argument that people generally exhibit a "person positivity bias" (Sears 1983) whereby they have positive expectations of others For example,

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Jill G Klein is Associate Professor of Marketing, INSEAD (e-mail jill klein@insead edu) Rohini Ahluwalia is Associate Professor of Marketing, Carlson School of Management, University of Minnesota (e-mail rahluwalia@csom umn edu) Both authors contributed equally to this research project, the order of authorship was determined by a coin toss This research was supported by grants from the Oswald Summer Fellowship, as well as from the General Research Fund of the University of Kansas to Rohini Ahluwalia and from the INSEAD Research and Development fund to Jill Klein The authors thank the participants of the New York University Research camp and Andrew John for their comments on a previous version of this article and ICPSR at the University of Michigan for providing access to American National Election Studies data

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prior research reveals that an overwhelming majority of individual political figures are evaluated positively (e.g., Klein 1996). Against this positive political background, negative information about a specific candidate is likely to stand out (Lau 1985). Thus, negative information may be perceptually more salient and therefore more readily processed and given more weight. It may also be perceived as more credible and more informative (e.g., Fiske 1980). As such, the figure-ground explanation implies a negativity effect for all candidates, irrespective of their individual popularity. Figure 1 presents this conceptual model.

The Motivational Explanation

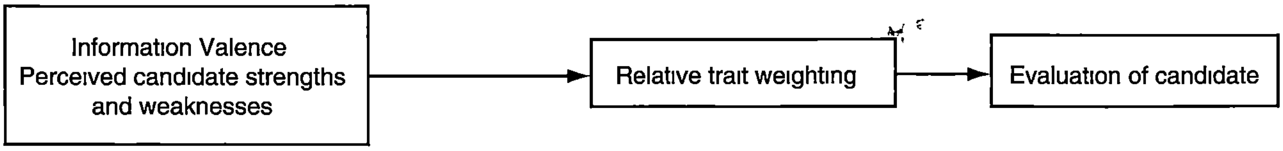
Most research on negativity grew out of a cognitive approach to judgments. From Anderson's (1981) cognitive algebra theory to the figure-ground explanation, nonmotivational explanations for negativity dominate. However, research in marketing (e.g., Ahluwalia 2002; Ahluwalia, Unnava, and Burnkrant 2001; Till and Shimp 1998) and social psychology (e.g., Ditto et al. 1998; Kunda 2000) has shifted toward an examination of how motivations affect judgments. For example, the cue diagnosticity approach—a dominant cognitive explanation for negativity—suggests that negative information is weighted most heavily because negatives are often more diagnostic or relevant than are positives (Skowronski and Carlston 1989). When the person or object to be evaluated is hypothetical or fictitious (as in most experiments in the impression formation paradigm), negative information is considered more relevant than positive information (Ahluwalia 2002). However, when the perceiver is familiar with the target, even a weak liking or preference is likely to invoke consistency motivation (Chaiken, Giner-Sorolla, and Chen 1996; Russo, Meloy, and Medvec 1998), such that preference-inconsistent negative information about the target may no longer be considered more relevant or diagnostic than preference-consistent positive information (e.g., Ahluwalia, Unnava, and Burnkrant 2001). Therefore, the formation of preferences invokes the biased processing of preference-inconsistent information through various defense mechanisms, such as generation of counterarguments (Ahluwalia, Unnava, and Burnkrant 2001; Chaiken, Giner-Sorolla, and Chen 1996), information distortion (Russo, Meloy, and Medvec 1998), source derogation (Ahluwalia 2000), and even selective avoidance of inconsistent information (Frey 1982). In other words, the relevance or diagnosticity assessment is subjective in nature and driven, in part, by the preferences of the perceiver (Herr, Kardes, and Kim 1991).

The motivational view therefore suggests that the negativity effect is not universal. Instead, a voter's preferences should determine whether a candidate's negatives are weighted most heavily. Consistent with this view, if we were to segment voters by their preference toward a given candidate, only those motivated to dislike the candidate should show a negativity effect; those who support the candidate should not be motivated to dwell on their candidate's negatives any more than his or her positives. Thus, a negativity effect should appear only in evaluations for which the candidate's negatives are preference consistent (see Figure 1).

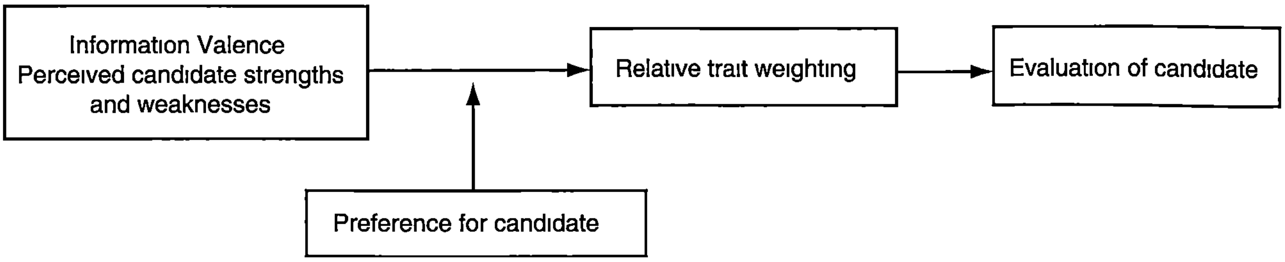
An implication of this view is that swing voters should not demonstrate a negativity effect, because swing voters by definition do not have strong preferences for one candidate over the other and have not decided against any of the candidates. We presume that swing voters have moderately positive views of all candidates (those who dislike both candidates are likely to be disenchanted and not vote at all; Ansolabhere and Iyengar 1995), which renders negative information preference inconsistent. This prediction is in contrast to the perceptual figure-ground explanation, as well as prior research that explicitly examines undecided or

FIGURE 1
Conceptual Models of Negativity in the Evaluation of Political Candidates

Perceptual Figure-Ground Explanation



Motivational Explanation



swing voters (Lau 1982) Specifically, in his analysis of 1980 NES data, Lau (1982) reports a stronger negativity effect for swing voters than for voters who had chosen a candidate (though this difference was not tested for statistical significance) Lau's findings have perpetrated the belief that the negativity effect is likely to be stronger and, therefore, that negative campaigning is more effective when many voters are undecided during the initial phases of a campaign (e g , primaries) This finding, however, could be an outcome of a variety of factors, including the differential importance of the negative and positive traits used in the 1980 NES survey

The motivational explanation thus predicts a negativity effect for only one segment of voters those who want the candidate to lose When voters judge a disliked candidate or the opponent of their favored candidate, negatives are consistent with their desires and thus should receive the greatest weight However, other voter segments are not likely to weight a candidate's weaknesses more heavily than his or her strengths This prediction is in direct opposition to expectations based on the figure-ground explanation, which posits a negativity effect for all voter segments, as we discussed previously Furthermore, the figure-ground explanation predicts that negativity is strongest for swing voters and those who prefer a candidate, namely, those judging candidates against generally positive expectations The motivational view, however, predicts that negativity is absent for these voters

We suggest that the finding of a negativity effect in prior research that has used the NES databases could be driven by a subset of voters those who want the candidate to lose When the data were aggregated across different segments of voters, an aggregate negativity effect emerged primarily because of this segment of voters A more disaggregated view of the data may reveal differences across segments of voters Therefore, we frame the first set of hypotheses in terms of the motivational explanation, as follows

H_1 Voters who prefer a candidate are not likely to exhibit a negativity effect in evaluating the candidate

H_2 Swing voters are not likely to exhibit a negativity effect in the evaluation of either candidate

H_3 Voters who prefer the candidate's opponent are likely to exhibit a negativity effect in evaluating the candidate

Although we do not make specific predictions about the strength of the voters' opposition or support, we might expect that those who are strong opponents of a candidate will show greater negativity than will weak opponents Alternatively, all opponents, regardless of the strength of their opposition, might view negative information as preference consistent To examine these two possibilities, we explore potential differences in negativity based on the strength of the opposition

Furthermore, if an aggregate-level negativity effect is driven by voters who want the candidate to lose, negativity should not be found in aggregate analyses that are less likely to include this group of voters The NES data are typically collected just before the election, when most voters have been exposed to substantial information about candidates By this stage of the campaign, most candidates have acquired a sizable group of opponents We argue that these opponents are likely to exhibit a negativity effect and drive its occurrence at the aggregate level In the early phase of the campaign, however, most voters will not have formed strong preferences Thus, negativity is less likely to emerge in data collected during the primary phase of the presidential race

There is a caveat to this prediction Even during the early phases of campaigning, a few candidates may have developed a significant group of opponents as a result of either their extreme platform or behavior or the polarization that occurred previously (e g , a current vice president running for the presidency) We predict an aggregate-level negativity effect for only these candidates In contrast, the perceptual figure-ground explanation would predict a negativity effect for all the candidates in the initial phases of a campaign On the basis of a motivational explanation for negativity, we predict the following

H_4 The likelihood of an aggregate-level negativity effect for a candidate will be related to the proportion of voters who dislike him or are motivated to view him negatively, the higher this proportion, the more likely is an aggregate-level negativity effect

H_5 If the responses from voters except those opposed to a candidate are aggregated, no significant negativity effect will emerge for political candidates

Summary

In summary, on the basis of recent motivational research in marketing (e g , Ahluwalia 2002) and psychology (e g , Kunda 2000), we hypothesize that voters are likely to weight a presidential candidate's weaknesses more heavily than his strengths only when they are motivated to view the candidate negatively (i e , prefer the opponent and/or dislike the candidate) From a marketing perspective, this group is likely to be the least critical to persuade in a political campaign (e g , it would be inefficient for a Democratic candidate to pursue diehard Republican voters) However, the segments that likely represent the biggest return on investment from persuasive communications—swing voters and those who have a favorable tendency toward the candidate—are not likely to be more sensitive to negative than to positive information In addition, we argue that negative information is not likely to be more impactful than positive information in the primaries, when a substantial group of opponents has not emerged for most candidates Thus, contrary to current belief, we predict somewhat limited benefits of negative compared with equally extreme positive information in the political domain

We begin our inquiry with a close examination of prior evidence of negativity in political evaluations and speculate that assessments of negativity at an aggregate level mask substantial differences among different segments of the population In Study 1, we begin with a reanalysis of data from the most recently published negativity effect study in this area, the 1992 presidential election (Klein 1996) We reanalyze this data by disaggregating it into relatively homogeneous groups based on candidate preferences to test H_1 through H_3 We repeat the same analysis for the 1996 NES data set to examine the generalizability of the effects In Study 2, we test H_4 and H_5 by examining candidate evaluations during the 1988 primary season (the most recent NES study of primaries)

The NES and Negativity

The NES database consists of interviews conducted before and after each presidential election by the Center for Political Studies of the Institute for Social Research at the University of Michigan These studies use a random probability sampling of eligible voters in the United States The preelection interviews (which contain the questions used in negativity analyses) are conducted in person from September to Election Day

Since 1980, the NES interviews also have contained a trait inventory that asks respondents to rate the candidates on a set of traits Lau (1982, 1985) analyzes the 1980 inventory, in which some of these traits were positively worded (e g , intelligent) and others were negatively worded (e g , dishonest) To allow for a more controlled approach (negative and positive items equivalent in extremity, relevance, and so forth), the trait inventory has used only positively worded traits (e g , honest) since 1984 Respondents could rate the trait as a weakness or a strength of the candidate Klein (1991, 1996) analyzes the NES data from the 1984, 1988, and 1992 elections to examine whether traits judged to reflect weaknesses were more predictive of final evaluations and voting than were traits that reflected strengths Through regression analysis, Klein assessed the weight given to each trait in the evaluation of each candidate The analysis revealed that traits for which the candidates received low ratings (candidate weaknesses) were given more weight than were traits for which they received high ratings (candidate strengths) This result was consistent for both the winning and the losing candidates for each of the three elections and thus supports a robust negativity effect These findings, however, are based on an aggregate-level data analysis, in which responses from all types of voters, irrespective of their varying candidate preferences (e g , opponents, supporters, swing voters), were combined in the assessment of negativity

Study 1: Negativity for Different Segments of Voters

Data and Methodology

The data In this study, we reanalyze the 1992 NES data set, along with new analyses of the 1996 NES data [1] The NES database contains 2485 (response rate = 72%) interviews for the 1992 election and 1714 (response rate = 71%) interviews for the 1996 election [2] The 1992 trait inventory asked respondents how well ("extremely well," "quite well," "not too well," or "not well at all") each of the following nine attributes described each of the candidates "intelligent," "compassionate," "moral," "inspiring," "provides strong leadership," "cares about people like you," "honest," "knowledgeable," and "gets things done" In the 1996 trait inventory, respondents rated Clinton on the same traits but rated Dole on all but two traits "intelligent" and "compassionate" The overall evaluation of each candidate was assessed by a thermometer score that asked the respondents to indicate how favorably or unfavorably they were toward the candidate on a 0–100 scale (higher numbers indicate feelings of warmth or favorableness, lower numbers indicate feelings of coldness or unfavorableness, and a score of 50 is neutral) [3] For ease of interpretation, the four-point trait rating scales and the thermometer ratings were converted to a 0–1 scale, on which higher numbers indicate greater favorableness [4]

For the analysis, five groups of voters were identified on the basis of two questions about voting choices The first asked respondents which candidate they thought they would vote for in the upcoming election, the second asked them whether their preference for the chosen candidate was strong or not strong Thus, for the 1992 election, the groups were as follows strong preference Clinton, weak preference Clinton, undecided or swing voters, weak preference Bush, strong preference Bush The swing voter group included respondents who chose the alternative "don't know" for the candidate choice question but stated that they intended to vote Unfortunately, the 1996 survey did not include the "don't know" option, and therefore we were unable to identify swing voters through this method Thus, we used an additional method to identify swing voters in both elections With the thermometer difference approach, we identified the segment of swing voters by selecting respondents whose thermometer scores for the two candidates were within 10 points (on a 100-point scale) of each other By definition, this segment comprises voters who have similar evaluations of both candidates and therefore are likely to swing from one candidate to another We estimated the negativity effect for each candidate at the aggregate level, as well as at the group level (i e , separately for each of the five groups of voters, with swing voters operationalized in two different ways in 1992)

Computation of trait weights (Stage 1) We estimated the weight given by respondents to each trait in the evaluation of a given candidate To this end, we specified a regression equation by which we could predict a candidate's thermometer score on the basis of his trait ratings when race, sex, party identification, and political ideology were constant[5] Following prior research (Ahluwalia 2000, Klein 1991, 1996), we used the unstandardized slope coefficient obtained for each trait as a measure of its weight in the overall evaluation This parameter is insensitive to variance differences among the traits (Lewis-Beck 1980, Pedhazur 1997) We used this procedure to generate trait weights for each candidate for each of the five groups of voters, as well as for the entire voter sample[6]

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[1] Unfortunately, the 2000 NES data include only a short version of the trait inventory and thus do not allow for a test of our hypotheses

[2] The sample size included in our analyses was actually smaller To be included in a given regression analysis, the respondent had to have supplied responses to the thermometer score and trait ratings for a given candidate and answered all the control variable questions Thus, for Clinton in 1992, the sample size was 1658, and for Bush, it was 2090 In 1996, the sample size was 1624 for Clinton and 1491 for Dole

[3] The thermometer scores were solicited before the trait inventory More than 100 questions about other issues (e g , the Persian Gulf War, Senate and House races and candidates) separated the thermometer questions and the trait inventory

[4] Thus, the trait ratings were coded as follows "not well at all" = 0, "not too well" = 33, "quite well" = 67, and "extremely well" = 1 The thermometer score was divided by 100

Estimation of the negativity effect (Stage 2) Next, consistent with prior research in the area, we examined the relationship between trait weights and trait ratings A negativity effect would imply a negative relationship between trait weights, as estimated by the slope coefficients generated for each trait (Stage 1), and mean trait ratings That is, a negativity effect is evident if the traits judged by voters to represent character weaknesses (low ratings) are weighted more heavily in the candidate's overall evaluation than are traits judged to represent character strengths (high ratings) In a univariate regression, we regressed trait weights on the trait ratings, we used the unstandardized slope coefficient as an indicator of the ability of the ratings to predict the weightings Using this procedure, we estimated negativity for the aggregate and each of the subsamples for each of the candidates

Results

1992 NES Consistent with Klein's (1996) findings, a significant aggregate-level negativity effect emerged for both the candidates (Bush and Clinton) However, the group-based analysis reveals that, as hypothesized, the negativity effect occurs only for voters who exhibit a preference for the opponent (Table 1) Specifically, there was a significant negativity effect ($p <$ 05) in the evaluation of Clinton for voters who had a strong preference for Bush This effect approached significance ($p <$ 10) for those voters who claimed a weak preference for Bush A statistically significant negativity effect was obtained in the evaluation of Bush by voters who exhibited both strong and weak preferences for Clinton The difference between the weak and the strong opponent groups was not significant for either candidate Most other slopes had a negative sign but were smaller than the slopes of the opponent groups, and none approached significance, in support of H_1–H_3 The negativity effect is not significant for any of the swing voter groups (irrespective of the method used to identify them) Furthermore, if we remove the opponent groups from the aggregate analyses, so that only the supporters and swing voters remain, the aggregate negativity effect is no longer significant for either Clinton (b = – 30, $p >$ 40) or Bush (b = – 47, $p >$ 11)

In Figure 2, Panels A and B, we provide a graphical illustration of the relationship between the trait ratings and trait weights we used to examine negativity in judgments of Bill Clinton Figure 2, Panel A, demonstrates the absence of the negativity effect for voters with a strong preference for Clinton, whereas Figure 2, Panel B, shows the negativity (negative relationship between trait weights and trait rat-

TABLE 1
Regression Coefficients for the Negativity Analysis of the 1992 Election

	Evaluation of Clinton			Evaluation of Bush		
Segment of Voters	**b**	**Standard Error**	**n[a]**	**b**	**Standard Error**	**n[a]**
Full sample	– 68**	27	1658	– 53***	13	2090
Strong preference for candidate	23	47	539	– 24	36	382
Weak preference for candidate	– 35	25	193	– 27	16	227
Swing voters (candidate choice question)	– 91	62	110	– 32	39	157
Swing voters (thermometer difference approach)[b]	– 07	23	382	– 03	22	511
Weak preference for opponent	– 54*	27	160	– 42**	15	246
Strong preference for opponent	– 56**	22	294	– 48***	14	613

*$p <$ 10
**$p <$ 05
***$p <$ 01

[a] Number of voters in the segment The sum of n for the subsamples does not add up to the n of the full sample because only those who intended to vote could be asked which candidate they planned to vote for and therefore be included in the subsamples identified by the voting choice question Although the means and trait weights are based on the sample sizes, note that the slope coefficients are based on the relationship between the nine trait ratings and the nine trait weightings

[b] Respondents who gave similar thermometer scores (within ten points) to both candidates This group includes almost all swing voters identified by the voting choice question, plus respondents who had similar candidate evaluations but did not intend to vote and respondents who may have been classified in the preference groups (using the candidate choice question) even though they had similar evaluations of the two candidates

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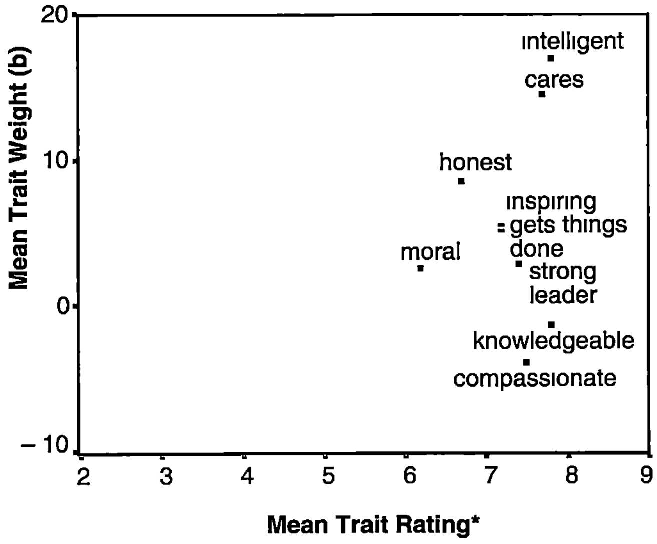
[5] Klein (1991, 1996) generates separate regression equations, one for each trait (plus control variables), but reports (1996) that the relative weighting of the traits remains the same when the weighting coefficient of each trait is assessed by a regression equation that includes all the candidate's traits and the control variables

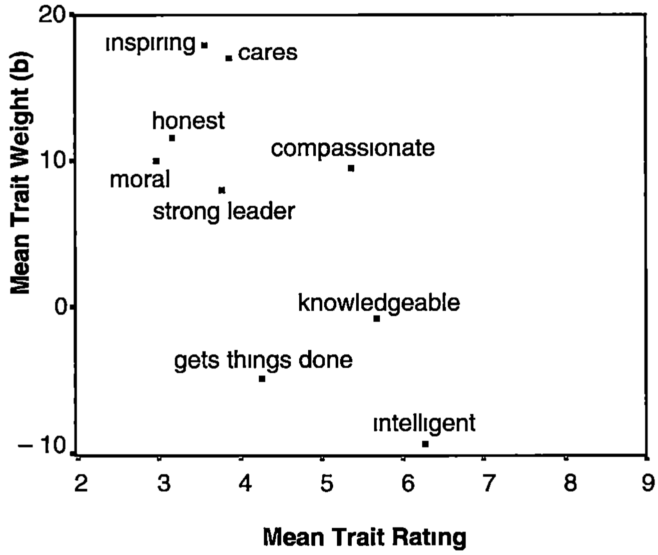
[6] We conducted analyses to examine the trait rating scale linearity to ensure that the four-point scale had equal intervals The scale was linear, and minor departures from linearity cannot account for the pattern of results reported

FIGURE 2
Relationship Between Trait Ratings and Trait Weights

A: Evaluation of Clinton by Voters with a Strong Preference for Clinton (1992 NES)



B: Evaluation of Clinton by Voters with a Strong Preference for Bush (1992 NES)



*Larger numbers indicate more positive trait ratings

ings) effect in the evaluation of Clinton by voters who strongly preferred Bush

1996 NES As we reveal in Table 2, a negativity effect emerges at the aggregate level for both Clinton and Dole The group-level analyses, however, reveal a significant negativity effect only for voters who preferred the opponent This effect tends to be stronger for the group with a strong compared with a weak preference for the opponent (though this difference is not statistically significant) The negativity effect is not significant for swing voters or for the groups who preferred the candidate When the two opponent groups are excluded from the aggregate analyses for each candidate, a significant negativity effect fails to emerge for either Clinton (– 17) or Dole (– 30, both *p*s > 30)

Analyses of trait variance differences A difference in the variance of negative versus positive traits could influence the slope coefficient of the negativity equation For example, if the negative traits have a higher variance than the positive traits, the coefficients (weight estimates) for these traits may be inflated in the first-stage regression, increasing the likelihood of a negative relationship between trait ratings and trait weighs (the negativity effect) in the second-stage regression To address this possibility, we used unstandardized regression coefficients to assess trait weights Prior research has indicated that though beta coefficients are sensitive to differences in the variance of independent variables, unstandardized regression coefficients are not (Johnson and Gustafsson 2000, Lewis-Beck 1980, Pedhazur 1997) and are preferable in situations in which variances may differ We find that for the groups for which we expected and obtained the strongest negativity effect (strong opponents), the correlation between trait rating and trait variance is either small and insignificant or in the opposite direction (i e , negative traits had lower, not higher, variance), which increases our confidence in the finding of a negativity effect (i e , it emerged despite the variance differences working against it) More important, the correlations between the mean trait variance and trait ratings were highly negative, which indicates a higher variance of negative traits (r's ranging from – 59 to – 95, all *p*s < 10) for all groups (supporters and swing) for which we had neither predicted nor obtained a significant negativity effect As such, this negative relationship may increase the likelihood of a negative coefficient (and negativity effect), thereby working against our prediction of the absence of this effect This likelihood could have contributed to the prevalence of negatively signed coefficients for these groups However, a statistically significant negativity effect does not emerge for these voters, despite negative correlations between the ratings and weightings, which provides even stronger support for our predictions[7]

Voting against candidates Although we do not find a negativity effect for the supporter groups, the data do not rule out the tendency of people to vote against candidates Simply stated, in a situation in which the voter is evaluating two candidates, the negative evaluation of the opponent (not the positive evaluation of the supported candidate) may

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[7] We also estimated the negativity equation (relationship between trait ratings and trait importance, using unstandardized b's), controlling for the variance in the trait ratings, with the following equation

$$\text{Trait importance (b)} = \alpha + \text{b(trait rating)} + \text{b(trait standard deviation)}$$

A negativity effect still emerged for the opponent groups, as we predicted In addition, when variance was controlled, the sign of the unstandardized slope coefficient for the undecided group flipped from (nonsignificantly) negative to (nonsignificantly) positive for both of the 1992 candidates

TABLE 2
Regression Coefficients for the Negativity Analysis of the 1996 Election

Segment of Voters	Evaluation of Clinton b	 Standard Error	 n[a]	Evaluation of Dole b	 Standard Error	 n[a]
Full sample	– 35*	16	1624	– 73***	13	1491
Strong preference for candidate	– 16	18	600	– 33	36	311
Weak preference for candidate	– 11	19	180	01	16	147
Swing voters (thermometer difference approach)	02	06	316	– 39	31	291
Weak preference for opponent	– 28*	14	154	– 69	15	168
Strong preference for opponent	– 44**	11	315	– 63**	14	544

*$p < 10$
**$p < 05$
***$p < 01$
[a]Number of voters in the segment

drive the formation of preference One way to determine whether people have a tendency to vote against is to assess whether their preference (and its strength) is determined to a greater extent by their dislike of the opposed candidate than by their liking of the supported candidate

To this end, we estimated two logit regression models (one for each election) For each voter who had formed a preference (i e , all voters except the swing voters), we used the overall evaluations of the supported and opposed candidates to predict the strength of the voters' preference for their chosen candidate (1 = "weakly prefer", 2 = "strongly prefer the candidate") These analyses help us assess whether the opponent's weaknesses, as opposed to the supported candidate's strengths, are more influential in strengthening a voter's preferences If people have a tendency to vote against, the coefficient for the opposed candidate should be significantly larger than that for the supported candidate There were 1638 cases in the 1992 regression and 1282 cases in the 1996 regression Our analyses reveal that voter evaluations of the supported candidate explain significantly greater variance in the strength of preferences than do evaluations of the opposed candidate for both the 1992 ($\text{coefficient}_{(\text{supported})} = 08$, $\text{coefficient}_{(\text{opposed})} = -03$, both $ps < 001$, $t = 8\ 92$, $p < 001$, for the difference between absolute values of the slope coefficients) and the 1996 ($\text{coefficient}_{(\text{supported})} = 11$, $\text{coefficient}_{(\text{opposed})} = -03$, both $ps < 001$, $t = 10\ 43$, $p <$ 001) elections This result indicates that people do not have a tendency to vote against candidates Their strength of preference is driven more by their liking of the supported candidate than by their dislike of the opposed candidate

Another way to address this issue involves examining the mean thermometer scores Voting against would translate into evaluations of opposed candidates that are disproportionately lower than the midpoint (neutral point of 50) of the scale compared with the magnitude by which evaluations of the supported candidate are higher than the midpoint Analyses of the thermometer scores from the 1992 and 1996 data sets do not support such a tendency In contrast, for all groups of voters who had formed a preference, the mean thermometer score for the supported candidate is farther above the midpoint of the thermometer scale than is the score of opposed candidate below the midpoint (statistically significant for six of eight groups with $ps < 001$ and directionally more distant for the remaining two groups)[8] That is, the supported candidate's evaluation is more favorable in magnitude than the opposed candidate's evaluation is unfavorable Furthermore, the overall evaluation for both candidates is slightly above the midpoint for the swing voters (Bush = 55, Clinton = 52 [1992 candidate choice method], Bush = 56, Clinton = 57 [1992 thermometer difference], Dole = 58, Clinton = 57 [1996]), which suggests that they were not deciding on a candidate against whom to vote

Discussion

The results from both the 1992 and 1996 elections converge in indicating that a negativity effect is not characteristic of all voters Only those who prefer the opponent weight a candidate's weaknesses more heavily than his strengths Thus, negative information about a candidate appears to be given more weight only when it is preference consistent Although there is a slight tendency for strong opponents to show the greatest negativity, this effect is also significant for weak opponents, which suggests that any level of opposition makes negative information preference consistent Negativity was not found for swing voters or those who prefer the candidate[9] Although the full aggregated sample exhibits negativity, this effect is not significant in the aggregate analyses when the opponent groups are excluded At a more general level, our results suggest that voters are more likely to vote for candidates than against them, and the negativity effect is more often absent than present in the evaluation of political candidates Thus, our findings suggest a new perspective on negativity in politics

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[8] Scores for the 1992 data set were as follows strong Clinton supporters = +27 versus –16, weak Clinton supporters = +14 versus –6, weak Bush supporters = +17 versus –9, and strong Bush supporters = +32 versus –17 (all $ps < 001$) For 1996, the scores were strong Clinton supporters = +34 versus –9 ($p < 001$), weak Clinton supporters = +16 versus –7 ($p < 001$), weak Dole supporters = +15 versus –12 (not significant), and strong Dole supporters = +28 versus –27 (not significant)

[9] The findings for swing voters cannot be attributed to a lack of knowledge or low level of political interest Analyses reveal that these voters were as knowledgeable about politics, not more skeptical about the government, and at least as likely to vote as the other groups

One point that requires further discussion relates to the possibility that voters base their trait ratings on their overall evaluation (halo effect) This possibility would be especially high if trait ratings immediately followed the overall evaluation question The overall evaluation and trait ratings, however, were separated by dozens of other questions relating to House and Senate candidates, opinions about a wide range of issues (e g , affirmative action, religion, foreign affairs), and various other topics Furthermore, the negativity effect is not dependent on the mean level of trait ratings (lower or higher, as implied by a halo effect) but on the differential weighting of traits based on their favorability (Ahluwalia 2002, Anderson 1981) A negativity effect would not be more likely to emerge for a voter who rates the candidate lower (versus higher) on all traits, instead, it would be much less likely to emerge for a voter who exhibits a strong halo effect for his or her negative overall evaluation (giving all traits similarly low ratings) In such a situation, the voter is not necessarily weighting the candidate's weaknesses more than his or her strengths, he or she is rating every trait as a weakness This rating reduces the possibility of a negativity effect, which requires both perceived strengths and weaknesses Therefore, by definition, a halo effect is not consistent with the emergence of a negativity effect[10]

The absence of a negativity effect in the 1992 and 1996 analyses for the voters who preferred the candidate is not likely to be a result of either smaller sample size or low power of the tests The sample size was similar in the supporter and opponent cells for both candidates in both elections When the data were aggregated across voters with strong and weak preferences for each candidate within each election—thus increasing the sample size—the negativity effect was still not statistically significant for either of the candidates for voters who preferred them Similarly, even when the ratings of both candidates by swing voters were pooled (for the 1992 NES) or we examined our larger samples of swing voters (from the thermometer difference approach), the relationship between trait ratings and trait weights was still not significant Thus, the absence of a negativity effect for all groups of voters, except those who preferred the opponent, appears to be a robust finding[11]

Study 2: Negativity During Early Stages of the Campaign

Data and Methodology

The 1988 NES Super Tuesday study was also conducted by the Center for Political Studies of the Institute for Social Research at the University of Michigan The study was conducted through telephone interviews between January 17 and March 8 (the early primary season) The sample size was 2076 respondents The survey included a trait inventory and thermometer ratings for all the candidates[12] To test the hypotheses, we assessed negativity for the primary candidates by the same technique used in Study 1

We predict (H_4) that the larger the proportion of voters who dislike a candidate, the higher is the likelihood that an aggregate-level negativity effect will emerge Furthermore, if this group of opponents is excluded from the data, an aggregate-level negativity effect should fail to emerge (H_5) The most conservative test of our hypothesis would be conducted by eliminating the strongest opponents In the absence of the strength of preference measure used in Study 1, we operationalized this group as those who gave low thermometer scores to a candidate (≤ 20) We chose this cutoff on the basis of the NES analyses from Study 1, which reveal that the strong opponents group (as defined by the vote choice and strength of preference measures) has a mean thermometer score as low as 22 (for Clinton in 1996)

Results

Aggregate-level negativity analysis As we show in Table 3, most candidates did not show a significant aggregate-level negativity effect during the primary, significant negativity emerged for only 3 of the 13 candidates, despite the large sample sizes (n > 600 for 10 of 13 candidates) A negativity effect had not yet emerged for Michael Dukakis, who went on to become the democratic nominee Klein (1991), who analyzed the 1988 main election NES database, reports a significant aggregate-level negativity effect for Dukakis in the data collected just before the final election

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[10] As further evidence against a halo explanation for our results, our analyses reveal a high correlation between the trait ratings of the strong supporter and strong opponent groups for each candidate ($r_{(\text{Clinton 1996})} = 90$, $r_{(\text{Dole 1996})} = 94$, $r_{(\text{Clinton 1992})} = 77$, $r_{(\text{Bush 1992})} = 85$, all $ps < 001$), which indicates that there was a high level of agreement between the two groups on the candidates' perceived strengths and weaknesses Consistent with our prior arguments, these data suggest that though the opponents were in general agreement with supporters about the relative strengths and weaknesses of the candidate, a negativity effect emerged for the former group because the candidates' weaknesses were apparently more diagnostic than their strengths in voters' overall evaluations

[11] Even the smaller samples in some cells are large enough to produce reliable estimates of trait weighting (Hair et al 1998) Note also that our negativity analysis examined the relationship between trait ratings and trait means Thus, we determined n in this analysis by the number of traits and did not vary it across subsamples

[12] Respondents in the 1988 study were asked how well each of the following eight attributes described each candidate running in the primaries "intelligent," "compassionate," "moral," "inspiring," "provides strong leadership," "decent," "cares about people like you," and "knowledgeable" Relative to later NES studies, "decent" appeared in this survey, and "honest" and "gets things done" did not Respondents indicated that the trait described the candidate "a great deal," "somewhat," "little," or "not at all"

TABLE 3
Negativity Coefficients by Candidate With and Without Strong Opponents: Super Tuesday 1988

Candidate	Negativity Coefficient Including Opponents (unstandardized b)	n[a]	Negativity Coefficient Excluding Opponents (unstandardized b)	n[a]
George H W Bush	– 45**	1626	– 31	1478
Gary Hart	– 33***	1579	– 19	1124
Jesse Jackson	– 65	1582	– 16	1281
Bob Dole	– 22	1305	– 09	1264
Pat Robertson	– 68***	1285	– 57***	956
Alexander Haig	– 36*	523	– 24	448
Michael Dukakis	– 22	862	– 05	815
Dick Gephardt	– 36	822	– 38	773
Paul Simon	– 17	720	– 17	671
Jack Kemp	– 32	691	– 25	645
Al Gore	– 38	635	– 29	604
Bruce Babbitt	– 35	248	– 35	223
Pierre Dupont	– 24	217	– 37	198

*$p < 10$
**$p < 05$
***$p < 01$
[a]Number of voters who rated the candidate

To test H_4, we predicted the negativity coefficient (the unstandardized slope coefficient for the relationship between trait ratings and trait weightings) using the proportion of voters classified as opponents, we find that the higher the proportion of opponents for a candidate, the greater is the negativity effect ($b = – 61, p < 05$)

Next, to confirm that the opponents were driving the emergence of an aggregate-level negativity effect in these data (H_5), we ran a new set of aggregate negativity analyses following the same technique but with the strong opponents excluded As we show in Table 3, with the exception of Pat Robertson,[13] a significant negativity effect failed to emerge for any of the candidates when opponents (who were motivated to view the candidate negatively) were not included in the analyses This result suggests that a majority of the voters in the primaries are not motivated to weight a candidate's weaknesses more heavily than his strengths (Note that the absence of negativity in the primaries is not due to voters' inability to distinguish the candidates' relative strengths and weaknesses, ranges of trait ratings in the primaries were similar to those of the general election candidates examined in Study 1)

Discussion

The findings of Study 2 support H_4 and H_5 The lack of a significant negativity effect for most candidates at this stage of the campaign supports our theorizing More important, we find that the aggregate-level negativity effect is likely a function of the proportion of strong opponents Negativity is likely to be a hallmark of this group of voters, and their presence appears to drive the aggregate-level finding Candidates who have not yet developed a group of opponents who are highly motivated to focus on their negatives are not likely to be subject to a significant aggregate-level negativity effect As such, these opponent groups are most likely to emerge when either the candidate is associated with some controversial policies or personal issues or the voters are faced with a choice between a preferred candidate and an opponent during the final phases of a campaign (as examined in Study 1) In short, the findings of this study further support our central proposition Only voters motivated to dislike the candidate exhibit a negativity effect in their evaluations

General Discussion

Consumer behavior researchers have long been interested in both the evaluation (e g , Ahluwalia 2000, Klein 1991, 1996, Morwitz and Pluzinski 1996, Simmons, Bickart, and Lynch 1993) and the marketing (e g , Homer and Batra 1994, Newman and Sheth 1985) of political candidates They have come to market candidates much as they market brands (McManus 1996, Newman 1994, Upshaw 1996)

One empirical finding that has had a substantial impact on the marketing of brands, as well as of political candidates, is the negativity effect Evidence of a significant negativity effect in six recent presidential elections has provided support for attack strategies in political campaigns and negative product advertising (Ansolabhere and Iyengar 1995, Pinkleton 1997) Prior theorizing and data also suggest a negativity effect for swing voters

Political pundits apparently advocate negativity, despite its potential ill effects on voter turnout and involvement, because they expect voters to weight negative information more heavily in their evaluations than they do positive information Prior research is consistent with this expectation, and several salient case studies—such as Bush's victory in the negative 1988 campaign—attest to negativity's effectiveness In contrast, our research suggests that the influence of negative information is overstated The time has come to reassess the role of negative information in political evaluations and reexamine the old adage that people only vote against, and not for, candidates

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[13] Even when we removed participants who gave Robertson thermometer ratings of 20 or less from the sample, he was still left with a substantial number of opponents (50% gave a score of less than 50)

The NES data from two elections (1992, 1996) and the Super Tuesday data (1988) converge in suggesting that the negativity effect is much less prevalent in the evaluation of political candidates than previously believed, it is significant only in judgments of candidates who the voter is motivated to dislike This motivation may occur because the voter either has a preference for an opponent or simply dislikes the candidate Our analysis indicates that this subset of the electorate drives the aggregate-level negativity effect obtained in previous research

In Study 1, we find a significant negativity effect only for the preferred candidate's opponent It did not emerge for either swing voters or those who preferred the candidate In Study 2, we again find that the aggregate-level negativity effect is dependent on the presence of strong opponents These findings indicate that swing voters and those judging their preferred candidate are less likely to exhibit a negativity effect

We could argue in favor of negative advertising on the basis of the notion that some voters may become strong opponents because of their exposure to negative candidate information Thus, a promising strategy would be to create a large group of opponents through negative advertising Elections research suggests, however, that initial preferences are derived from perceived candidates' positions on high valence issues, party affiliation, and other long-standing ideologies (see Kinder 1998) Furthermore, our results for swing voters (Study 1) and the vast majority of primary voters (Study 2) show that negative candidate information is not given greater weight than is positive information before preferences are formed In addition, preference strength is better predicted by evaluations of the preferred candidate (presumably based on positive information) than by evaluations of the opposed candidate (potentially based on negative information) Together, these arguments suggest that negative attack advertisements are not more likely than positive advertisements to turn undecided voters into opponents

We do not find a significant positivity effect in any of our analyses The tendency toward low (but nonsignificant) levels of negativity implies the possible combined effects of both cognitive and motivational forces and suggests the need to understand relative rather than alternative roles of cognitive and motivational explanations Negative information is perceptually more salient and therefore likely to garner more attention (e g , Jones and McGillis 1976) However, the manner in which it is processed (e g , discounted, supported) and how much weight it receives in overall impressions depends on the motivation of the perceiver Although a consistency motivation that accompanies a weakly positive attitude may be adequate to attenuate negative information's perceptual advantages, a strong attachment (and high motivation) may be needed to completely reverse them (Ahluwalia, Unnava, and Burnkrant 2001)

Our research paradigm is somewhat different from that of impression formation studies (e g , Anderson 1981, Fiske 1980), in that we use the voters' self-reported trait ratings and overall candidate evaluations to compute the negativity effect Although our paradigm is not the most prevalent method for estimating a negativity effect (given the predominance of experimental research that uses unknown targets), it is well established in and consistent with prior field research that has examined the negativity effect in the context of familiar targets (e g , Ahluwalia 2000, Klein 1991, 1996, Lau 1982) Furthermore, we measured all candidate traits with the primarily positively worded traits used in the NES surveys to avoid confounds associated with the differential wording of items However, this method may underrepresent the extremity of some negative beliefs Additional research should examine the extent to which such a bias is likely Scales with bipolar endpoints (dishonest/honest) may be better able to capture the full range of voter beliefs

Implications for Political Marketing Management

Our findings challenge the accepted wisdom that negative campaigning is an effective means of persuading critical voters who either have weak preferences or are undecided (Ansolabhere and Iyengar 1995, Lau 1985) Whereas political pundits predict that attack advertising will become more common as more independents and swing voters dominate the U S electorate (Ansolabhere and Iyengar 1995, Lau and Sigelman 1998), our findings suggest that the wisdom of this strategy should be reassessed because these target audiences are not motivated to dwell on negatives The disparagement communicated in negative advertisements will be music to the ears of voters who already dislike the candidate, but preaching to the choir is not the optimal objective of campaign spending

We note that the absence of a negativity effect does not imply that negative information does not have any impact on these voter segments, it simply means that it is not more effective than equally extreme positive information If a candidate is the target of a negative advertisement, the advertisement is likely to attenuate his or her evaluation (e g , Pinkleton 1997) However, this attenuation will be of approximately the same magnitude as the enhancement likely to occur in response to an equally extreme positive advertisement We speculate that if the negative information presented in an attack is more extreme than the available positive information the candidate offers in support of his or her candidacy, or it corresponds to a particularly salient issue, negative campaigning may be more persuasive than positive advertising, especially for swing and weak preference voters However, most negative campaigning in the marketplace consists of mudslinging attacks that focus on a small corner of a candidate's career and address trivial issues (Kamber 1997), and therefore its value to the campaign is potentially questionable Examples abound of situations in which negative campaigning about minor issues failed to influence voter groups For example, Steve Forbes and Lamar Alexander (1996 primaries) launched negative campaigns against Bob Dole based on narrow issues, Dole emerged as the front runner In the 2004 Iowa caucus, the two candidates who ran negative campaigns (Howard Dean and Dick Gephardt) finished solidly behind those who promoted more positive campaigns (John Kerry and John Edwards) Even in the general elections, the main attacker has not always emerged as the winner Consider Bush (1992) and Dole (1996)

In summary, our research suggests that campaign managers might not want to target the opponent's negatives for the sake of negativity The absence of a negativity effect implies that only when the content of negative information is of an extreme or compelling nature (compared with possible positive information) is it likely to be more effective than its positive counterpart in changing the preferences of the most malleable swing voters

Implications for Nonpolitical Marketing Management

Our research provides a stringent test of the negativity hypotheses Voting contexts are different from brand judgments (for which some limitations of the negativity effect have been uncovered, Ahluwalia 2002) Voters are faced with a choice (instead of a judgment), the target is a person (instead of a product), and data are collected in naturalistic settings in which the salience advantages of negative information are magnified (instead of in laboratory contexts in which subjects are directed to process all information, which attenuates the salience advantage) Therefore, a negativity effect should be much more likely to emerge in political candidate research than in experiments that focus on brand judgments That a significant negativity effect does not emerge for multiple voter segments even within this context presents a greater challenge to the pervasiveness of this effect in the marketplace

Although extending our findings from the political to the product domain is necessarily speculative, some analogies can be made that could be tested in further research For example, swing voters are comparable to low-loyalty and switcher segments Our findings suggest that these consumers will not weight the brand's negatives more heavily than its positives Thus, attack advertising targeted to these groups to steal market share from the competition will not be more effective than a positive campaign

The finding that a negativity effect was absent for lesser known candidates in the 1988 primaries has implications for competition with new products and brands Attacking a new entrant might be less productive than simply promoting the positives of an existing brand, unless the established brand enjoys a base of strong supporters who will represent strong opponents to a new offering This group will carefully consider negative information about the new entrant For its part, attack advertisements by the new entrant will be most effective if they are targeted at those consumers who already are dissatisfied with current offerings Therefore, a proper understanding of the size and passion of segments that represent different loyalty levels is essential in the battle for market share

Our findings are consistent with those of other studies that find that a positive corporate image and strong consumer loyalty offer some protection to a firm faced with negative publicity (e g , Ahluwalia, Unnava, and Burnkrant 2001) For example, recent research in corporate social responsibility finds that a prior positive corporate image protects the corporation from the impact of negative information exposed during a crisis (Klein and Dawar 2004) Our research suggests that an understanding of the strength of consumer preferences for a brand or corporation is important for designing effective strategies to respond to negative publicity

In conclusion, our research joins a growing number of studies that examine the effect of motivations on information processing (e g , Ahluwalia, Unnava, and Burnkrant 2001, Kunda 2000, Till and Shimp 1998) We find that though negative information may have perceptual advantages, a focus on cognitions alone cannot explain its role in complex naturalistic environments in which people are driven by a variety of motivations (Chaiken, Giner-Sorolla, and Chen 1996) Our results suggest the fruitfulness of reexamining other findings in marketing that are based on a strictly cognitive information processing perspective

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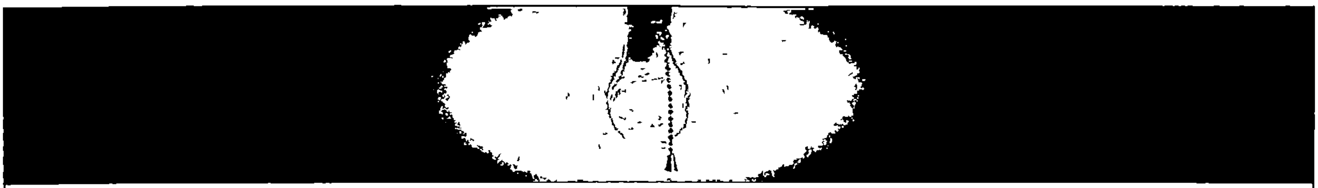

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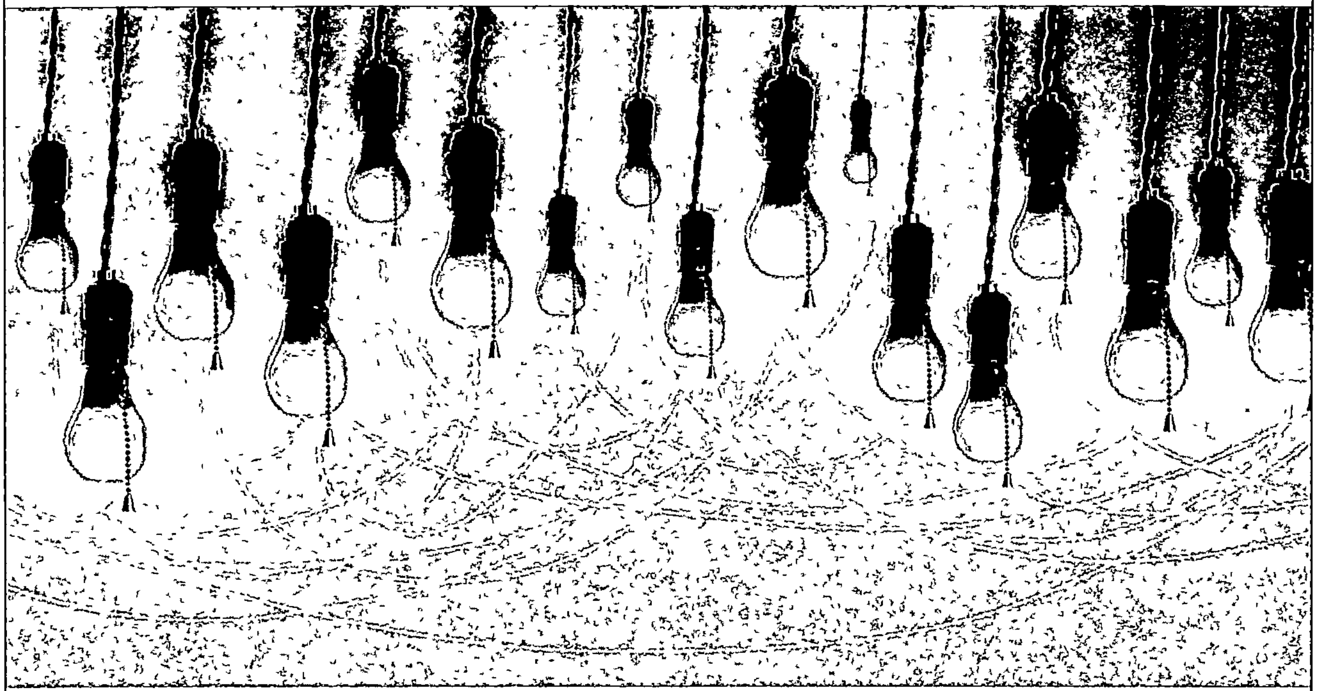

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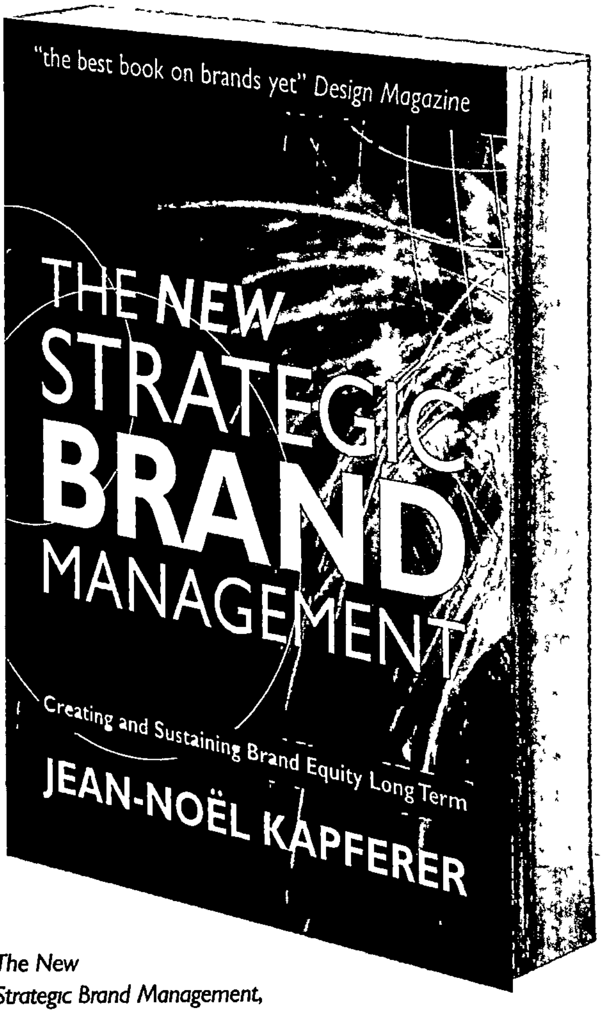
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SHETH FOUNDATION/JOURNAL OF MARKETING AWARD

The recipients of the 2004 Sheth Foundation/Journal of Marketing Award, which is funded through the American Marketing Association Foundation, are **Shelby D. Hunt** and **Robert M. Morgan** for their article, "The Comparative Advantage Theory of Competition," which appeared in the April 1995 (Vol 59, No 2) issue of the *Journal of Marketing*

Nominations for the award were solicited from members of the *JM* Editorial Review Board, and a selection committee of prior editors of AMA journals made the final selection In selecting the article, the selection committee observed that the article offers a clear alternative to the traditional economic view of markets The article provides a theoretically grounded case for the unique perspective and contribution of the marketing discipline to the analysis of markets and the management of the firm The article is widely cited and used in both doctoral and MBA courses

The Sheth Foundation/Journal of Marketing Award, which was established through the generosity of the Sheth Foundation, honors articles published in the *Journal of Marketing* that have made long-term contributions to the *discipline of marketing* The criteria for selection include the quality of the article's contribution to theory and practice, the article's originality, its technical competence, and its impact on the field of marketing Articles eligible for the award must have been published at least five years but not more than ten years earlier

The award carries both a plaque and a cash prize, which were presented at the American Marketing Association's 2005 Winter Marketing Educators' Conference, held February 11–14, at the Westin La Cantera Resort in San Antonio, Tex.

- Shelby D Hunt is Jerry S Rawls and P W Horn Professor of Marketing, Rawls College of Business Administration, Texas Tech University
- Robert M Morgan is Professor of Marketing and J Reese Phifer Faculty Fellow in Marketing, Marketing Area Coordinator, Culverhouse College of Commerce and Business Administration, University of Alabama

HAROLD H. MAYNARD AWARD

Stephen L. Vargo and **Robert F. Lusch** have been selected as recipients of the 2004 Harold H Maynard Award for their article, "Evolving to a New Dominant Logic for Marketing," which appeared in the January 2004 (Vol 68, No 1) issue of the *Journal of Marketing* The article was chosen by members of the *Journal of Marketing* Editorial Review Board for its significant contribution to *marketing theory and thought*

The award carries both a plaque and a cash prize, which were presented at the American Marketing Association's 2005 Winter Marketing Educators' Conference, held February 11–14, at the Westin La Cantera Resort in San Antonio, Tex

- Stephen L Vargo is Visiting Professor of Marketing, Robert H Smith School of Business, University of Maryland
- Robert F Lusch is Department Head and Professor of Marketing, Eller College of Management, University of Arizona

MARKETING SCIENCE INSTITUTE/H. PAUL ROOT AWARD

Roland T. Rust, **Katherine N. Lemon**, and **Valarie A. Zeithaml** have been selected as the recipients of the 2004 MSI/H Paul Root Award for their article, "Return on Marketing Using Customer Equity to Focus Marketing Strategy," which appeared in the January 2004 (Vol 68, No 1) issue of the *Journal of Marketing* The article was chosen by members of the *Journal of Marketing* Editorial Review Board for its significant contribution to the *advancement of the practice of marketing*

The award was presented at the American Marketing Association's 2005 Winter Marketing Educators' Conference, held February 11–14, at the Westin La Cantera Resort in San Antonio, Tex

- Roland T Rust is David Bruce Smith Chair in Marketing, Director of the Center for e-Service, and Chair of the Department of Marketing, Robert H Smith School of Business, University of Maryland
- Katherine N Lemon is Associate Professor, Wallace E Carroll School of Management, Boston College
- Valarie A Zeithaml is Roy and Alice H Richards Bicentennial Professor and Senior Associate Dean, Kenan-Flagler School of Business, University of North Carolina, Chapel Hill

Rust as New *JM* Editor

Roland T Rust has been named editor of the *Journal of Marketing* Rust, whose three-year term begins July 1, 2005, replaces Ruth N Bolton, who has served as editor since July 2002 Rust holds the David Bruce Smith Chair in Marketing at the Robert H Smith School of Business, University of Maryland, where he is Chair of the Marketing Department and directs the Center for Excellence in Service His lifetime achievement honors include the American Marketing Association's Gilbert A Churchill Award for Lifetime Achievement in Marketing Research, the Outstanding Contributions to Research in Advertising award from the American Academy of Advertising, the AMA's Career Contributions to the Services Discipline Award, Fellow of the American Statistical Association, and the Henry Latané Distinguished Doctoral Alumnus Award from the University of North Carolina at Chapel Hill

Rust has won best article awards for articles in *Marketing Science*, *Journal of Marketing Research*, *Journal of Marketing* (twice), *Journal of Advertising*, and *Journal of Retailing*, as well as MSI's Robert D Buzzell Best Paper Award (twice) His book, *Driving Customer Equity* (written with Valarie Zeithaml and Katherine Lemon) won the 2002 Berry-AMA Book Prize for the best marketing book of the previous three years His work has received extensive media coverage, including a *BusinessWeek* cover story and an appearance on *ABC World News Tonight with Peter Jennings*

Rust is the founder and Chair of the AMA Frontiers in Services Conference, and he serves as founding Editor of the *Journal of Service Research* Rust also is an Area Editor at *Marketing Science* and *Production and Operations Management*, and he serves on the editorial review boards of *Journal of Marketing Research*, *Journal of Marketing*, and *Journal of Interactive Marketing* He has consulted with many leading companies worldwide, including American Airlines, AT&T, Chase Manhattan Bank, Dow Chemical, DuPont, FedEx, IBM, Nortel, Procter & Gamble, Sears, Unilever, and USAA

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Pierre Chandon, Vicki G. Morwitz, & Werner J. Reinartz

Do Intentions Really Predict Behavior? Self-Generated Validity Effects in Survey Research

Studies of the relationship between purchase intentions and purchase behavior have ignored the possibility that the very act of measurement may inflate the association between intentions and behavior, a phenomenon called "self-generated validity" In this research, the authors develop a latent model of the reactive effects of measurement that is applicable to intentions, attitude, or satisfaction data, and they show that this model can be estimated with a two-stage procedure In the first stage, the authors use data from surveyed consumers to predict the presurvey latent purchase intentions of both surveyed and nonsurveyed consumers In the second stage, they compare the strength of the association between the presurvey latent intentions and the postsurvey behavior across both groups The authors find large and reliable self-generated validity effects across three diverse large-scale field studies On average, the correlation between latent intentions and purchase behavior is 58% greater among surveyed consumers than it is among similar nonsurveyed consumers One study also shows that the reactive effect of the measurement of purchase intentions is entirely mediated by self-generated validity and not by social norms, intention modification, or other measurement effects that are independent of presurvey latent intentions

Consumers' self-reported intentions have been used widely in academic and commercial research because they represent easy-to-collect proxies of behavior For example, most academic studies of satisfaction use consumers' intentions to repurchase as the criterion variable (for an exception, see Bolton 1998), and most companies rely on consumers' purchase intentions to forecast their adoption of new products or the repeat purchase of existing ones (Jamieson and Bass 1989) However, it is well known that consumers' self-reported purchase intentions do not perfectly predict their future purchase behavior, nor do these differences cancel each other out when intentions and behavior are aggregated across consumers In a meta-analysis of 87 behaviors, Sheppard, Hartwick, and Warshaw (1988) find a frequency-weighted average correlation between intentions and behavior of 53, with wide variations across measures of intentions and types of behavior (for a review, see Morwitz 2001)

To improve the ability to forecast behavior from intentions, researchers have tested alternative scales (Reichheld 2003, Wansink and Ray 2000) and have developed models that account for biases in the measurement and reporting of intentions, the heterogeneity across customers, changes in true intentions between the time of the survey and the time of the behavior, and the stochastic and nonlinear nature of the relationship between intentions and behavior (Bemmaor 1995, Hsiao, Sun, and Morwitz 2002, Juster 1966, Kalwani and Silk 1982, Manski 1990, Mittal and Kamakura 2001, Morrison 1979) In practice, the studies adjust the intention scores by analyzing the actual purchase behavior of consumers whose purchase intentions have been measured previously For example, the popular ACNielsen BASES model forecasts aggregate purchase rates by applying conversion rates to measured purchase intentions (e g , it assumes that 75% of consumers who checked the top purchase-intentions box will actually purchase the product) To obtain these conversion rates, BASES uses previous studies that measured the purchase intentions of consumers and then tracked their actual purchases

However, a limitation of these studies is that they focus on the internal rather than the external accuracy of purchase-intention measures That is, the studies measure the improvement in the ability to forecast the behavior of consumers whose intentions they previously measured, not the behavior of consumers whose intentions they did not measure Therefore, the studies assume that they can extrapolate the intention–behavior relationship of nonsurveyed consumers on the basis of the relationship that surveyed consumers exhibit In doing so, the studies ignore the

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Pierre Chandon is Assistant Professor of Marketing, INSEAD, and currently he is Visiting Assistant Professor of Marketing, Kellogg School of Management, Northwestern University (e-mail pierre chandon@insead edu) Vicki G Morwitz is Associate Professor of Marketing and Robert Stansky Faculty Research Fellow, Stern School of Business, New York University (e-mail vmorwitz@stern nyu edu) Werner J Reinartz is Associate Professor of Marketing, INSEAD (e-mail werner reinartz@insead edu) The authors acknowledge the helpful input of the anonymous *JM* reviewers, John Lynch, Gilles Laurent, and Albert Bemmaor, as well as those who participated when the authors presented this research at INSEAD, at the Association for Consumer Research Conference, Portland, at the Marketing Science Conference, College Park, Md , and at the ESSEC-HEC-INSEAD conference In addition, the authors thank the French online grocer Prodigy Services Company and Allison Fisher for providing data and INSEAD for its financial assistance

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potentially important problem that the measurement of intentions itself might self-generate some of the association between the intentions and the behavior of a particular consumer (Feldman and Lynch 1988).

Finding that part of the predictive power of purchase intentions is an artifact of the measurement would have serious implications for researchers and managers. It would suggest that studies that measure the strength of the association between intentions and behavior on the same sample of consumers overstate the external predictive accuracy of purchase intentions. This would explain why so many new products fail even after they perform well in purchase-intention tests. In general, researchers who are interested in measuring the true association between two constructs (in this case, for consumers whose behavior was not influenced by the measurement) would need a method that detects and corrects for the effects of measurement.

In this research, we develop a comprehensive latent framework to conceptualize the reactive effects of the measurement of purchase intentions. This framework distinguishes between two sources of measurement reactivity. The first is self-generated validity effects, which we define as a strengthened relationship between latent intentions and behavior due to the measurement of intentions. The second source includes all measurement effects that are independent of latent intentions, such as those that social norms or postsurvey intention modifications create.

We also describe a two-stage procedure to detect whether the act of measurement alters the strength of the relationship between a latent construct that is measured through surveys, experiments, or observations and its consequence (e.g., intentions–behavior, attitudes–intentions, attitudes–behavior, satisfaction–behavior) and to determine the true magnitude of the relationship in the absence of measurement. We demonstrate three empirical applications of this method using large-scale data sets that contain purchase or profitability data from both consumers whose purchase intentions were measured and similar consumers whose purchase intentions were not measured. In the three applications (groceries, automobiles, and personal computers [PCs]), we show that the strength of the relationship between latent intentions and behavior is stronger for surveyed consumers than for similar nonsurveyed consumers. In the final section, we discuss the managerial and research implications of our results.

Self-Generated Validity and Other Sources of Measurement Reactivity

Reactive Effects of Measurement

Ample evidence indicates that measurement can influence both the intensity of a measured construct and its association with other constructs. In intentions research, the reactive effects of measurement have been called the "mere measurement effect," "the self-erasing error of prediction," and "self-prophecy." We refer to the behavioral differences between surveyed and nonsurveyed consumers as the "reactive effects of measurement" or simply as "measurement reactivity."

In competitive markets in which most existing customers have positive attitudes toward a product category, the measurement of purchase intentions increases purchasing in the category of accessible and preferred brands. Research has shown these effects for both hypothetical and real brands, for financially important and relatively inconsequential behaviors, and for short (a few minutes) and long (six months) delays between the measurement and the behavior (Chandon, Morwitz, and Reinartz 2004; Dholakia and Morwitz 2002b; Fitzsimons and Morwitz 1996; Morwitz and Fitzsimons 2004).

In a related stream of research, studies show that asking consumers to predict their future behavior influences the likelihood that they will engage in that behavior (Sherman 1980; Spangenberg 1997; Spangenberg and Greenwald 1999; Sprott et al. 2003). Focusing on socially normative behavior, these studies demonstrate that if respondents are asked to predict the likelihood that they will perform a behavior in the future, they are more likely to engage in socially desirable behaviors, such as voting or recycling, and less likely to engage in socially undesirable behaviors, such as singing "The Star-Spangled Banner" over the telephone.

Self-Generated Validity Theory

The self-generated validity theory (Feldman and Lynch 1988), the most popular explanation of the reactive effects of measurement, uses two lines of argument. First, preexisting intentions may become more accessible in memory when the researcher asks the question. (It is also possible that consumers have no preexisting intentions and form them only in response to the researcher's question.) The measurement process thereby leads survey respondents to form judgments that they otherwise would not access in their memory or that they otherwise would not form. Second, higher relative accessibility and diagnosticity of intentions, compared with other inputs for purchase decisions (e.g., tastes, mood, competitive environment), may make subsequent purchase behavior more consistent with prior intentions.

Several studies provide indirect evidence in support of the self-generated validity theory for public opinion (Simmons, Bickart, and Lynch 1993) and marketing research (Fitzsimons and Morwitz 1996; Morwitz and Fitzsimons 2004; Morwitz, Johnson, and Schmittlein 1993). However, none has examined the core prediction of self-generated validity theory directly, namely, that the association between prior intentions and behavior is stronger among surveyed consumers than among similar nonsurveyed consumers. The studies have been unable to test this prediction because they have not estimated the purchase intentions of consumers who were not surveyed.

Consistent with Feldman and Lynch's (1988) predictions, Fitzsimons and Morwitz (1996) find that the measurement of general intentions to purchase automobiles increases the likelihood that buyers will repurchase the automobile brand that they previously owned and that first-time buyers will purchase brands with large market shares. Under the assumption that prior purchase rates or market shares are proxies for latent, brand-specific purchase intentions, Fitzsimons and Morwitz's results suggest that the measurement of general intentions increases the association between latent, brand-specific intent and brand choice.

Similarly, in a series of laboratory studies, Morwitz and Fitzsimons (2004) find that the measurement of general purchase intentions for candy bars makes consumers more likely to choose brands that they like and less likely to choose those that they dislike. If we consider prior brand preference a proxy for intention to purchase the brand, this study suggests that the measurement of consumers' intentions to buy from the category increases the association between their latent intentions to buy the brand and the likelihood of subsequently choosing this brand. Finally, Morwitz, Johnson, and Schmittlein (1993) examine the effects of repeated measurements of intentions (and behavior) on people with high and low initial measured purchase intentions. They find that the repeated measurement of intentions and behavior increases the association between behavior and the initial measure of intentions. However, their analysis is restricted to consumers whose purchase intentions have been measured at least once.

Other Sources of Measurement Reactivity

Ignoring obvious alternative explanations, such as selection biases, that violate our definitional assumption that surveyed and nonsurveyed consumers are identical, we consider at least two other explanations for the reactive effects of measurement in purchase-intentions surveys: social norms and intention modification. Both differ from self-generated validity in that they operate independently of consumers' intentions at the time of the survey.

In the context of socially normative behaviors, Sherman (1980) shows that asking people to predict their future behavior biases their reported intentions toward a social norm (e.g., donating to charities, not singing over the telephone). Consumers then act according to their newly reported intentions, not according to their prior unreported intentions, to reduce the cognitive dissonance between their reported intentions and their behavior (Spangenberg and Greenwald 1999, Sprott et al. 2003).

With regard to intention modification, consumers tend to evaluate market research surveys positively because they either find the survey informative or enjoy being asked their opinion (Dholakia and Morwitz 2002a, Sudman and Wansink 2002). In a subsequent stage, this positive evaluation of the survey carries over to the evaluation of the company and its products. Consumers also regard the survey as a signal of the firm's customer orientation, which directly improves their evaluation of the company and its products. In both cases, the positive attitude triggered by the survey leads to greater purchasing by surveyed consumers.

Both explanations share the view that the measurement of purchase intentions modifies consumers' purchase intentions rather than makes prior intentions more accessible in memory or more diagnostic of future purchase decisions. In the context of purchase-intention surveys for common products and services, the measurement effects make consumers more likely to report positive purchase intentions and then actually purchase the product, regardless of their purchase intentions at the time of the survey.

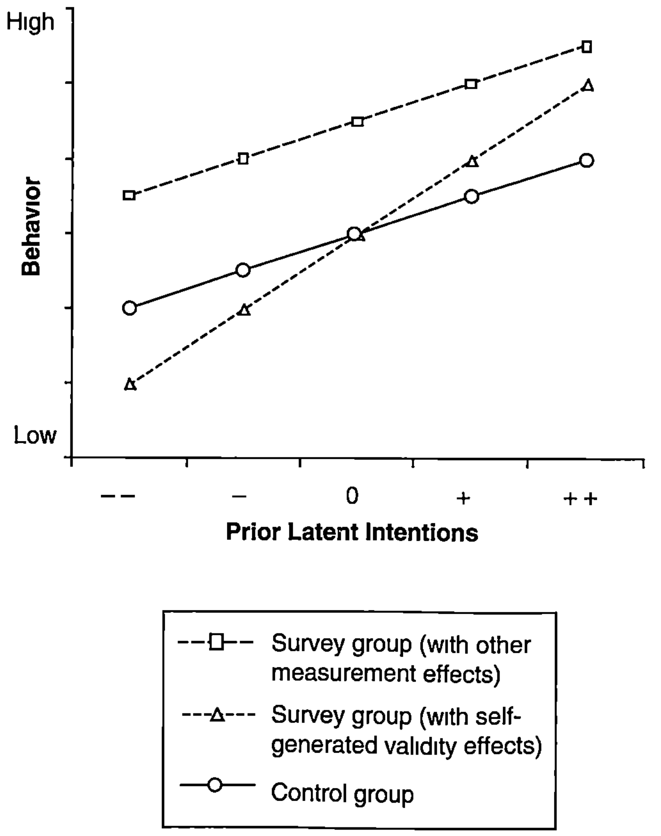
Summary

To better understand the differences between the possible sources of measurement reactivity, in Figure 1 we plot hypothetical purchase behavior (e.g., purchase quantity) as a function of presurvey, latent (i.e., unmeasured) purchase intentions for both consumers whose intentions were not measured (control group) and those whose intentions were measured.

In Figure 1, we show that the different sources of measurement reactivity have markedly different effects on purchase behavior and on the link between intentions and behavior. Intention modification leads to a consistent upward shift in purchase behavior but leaves the slope of the relationship between presurvey intentions and behavior unchanged. In contrast, self-generated validity effects do not lead to a general increase in purchase behavior but strengthen the association between intentions and behavior. If measurement reactivity is due to self-generated validity, intention measurement makes consumers with positive purchase intentions more likely to purchase but also makes consumers with negative purchase intentions less likely to purchase, which increases the steepness of the slope between intentions and behavior.

In Figure 1, we also show that in contrast to intention modification, self-generated validity effects do not necessarily lead to measurement reactivity. For example, the

FIGURE 1
Self-Generated Validity and Other Sources of Measurement Reactivity



measurement of intentions does not change the purchase behavior of consumers who have neutral purchase intentions, that is, those who are undecided about purchasing and not purchasing Similarly, self-generated validity effects cancel out if there are as many positively inclined consumers as there are negatively inclined ones (i e , if the distribution of purchase intentions is symmetric around the neutral point) In this case, the average purchase behavior of surveyed consumers may be the same as the average purchase behavior of similar nonsurveyed consumers, though the purchase behavior of each consumer is more extreme However, self-generated validity effects are a sufficient condition for measurement reactivity when the majority of consumers have positive purchase intentions—the most common case in field studies of actual products in competitive markets—because the measurement of purchase intentions makes these consumers more likely to follow their intentions (i e , more likely to purchase)

Conceptualizing and Estimating the Reactive Effects of Measurement

A Latent Model of the Effects of the Measurement of Purchase Intentions

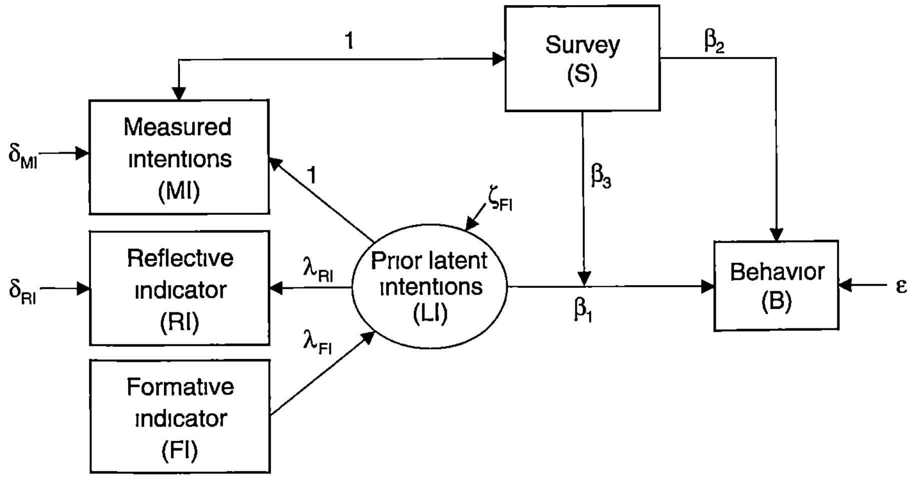
The framework we present in Figure 2 relates purchase behavior (B) to measured (self-reported) purchase intentions (MI), prior latent (unmeasured) purchase intentions (LI), and the survey that measures purchase intentions (S) In line with conventional representations of structural equation models, we use rectangles to represent observed variables, ovals for latent variables, arrows between constructs for causal relations, an arrow pointing to another arrow for an interaction effect, and a double arrow for a correlation

We consider LI an unobserved hypothetical construct that captures, without error, consumers' determination to purchase just before the time of the survey Thus, B is a function of LI (with regression coefficient β_1) and random error (ε) In the model, we assume that all consumers, both surveyed and nonsurveyed, have some latent purchase intentions at the time of the survey However, this assumption does not imply that consumers have decided whether to buy before the survey, because prior latent intentions can be neutral, rather, it implies that consumers do not form intentions only when they are surveyed (we explore the implications of this assumption in the "General Discussion" section) By definition, these prior latent intentions are independent of whether the consumers' intentions are surveyed or not If S is randomly administered, LI are identical for surveyed and nonsurveyed consumers, as we show in Figure 2 by excluding a link between S and LI

We present the observed measures of LI on the left-hand side of Figure 2 Purchase intentions measured by the survey constitute one such measure, but this is not the only one We can also measure latent intentions by other reflective indicators (denoted RI_1, RI_2, , RI_n), including indirect measures, such as physiological measures or implicit tests, and behavioral measures, such as information search or the purchase of complementary products Both LI and the measurement error (δ_{RI}) influence these reflective indicators Other indicators of LI may be formative (e g , prior purchase behavior, demographics), in which case LI is a function of the m formative indicators (denoted FI_1, FI_2, , FI_m) and a random disturbance term (ζ_{FI}) We assume that these other indicators are independent of intention measurement (no correlation with S), whereas MI exist only for surveyed consumers (the correlation between MI and S is one) To identify the latent model, we must scale it by choosing one indicator for which the factor loading is set to one and the intercept is zero Choosing MI as the scaling indicator enables us to scale the LI to the familiar units of MI In doing so, we assume that there are no systematic reporting biases and that surveyed consumers retrieve their prior LI from memory (We subsequently report simulation studies in which we examine what happens if MI are systematically biased upward because of social norms or intention modification)

With the latent model, we can define self-generated validity effects more broadly Originally, Feldman and Lynch (1988) studied the effects of measurement on the

FIGURE 2
A Latent Model of the Reactive Effects of the Measurement of Purchase Intentions



observed correlations among constructs. For example, Simmons, Bickart, and Lynch (1993) asked specific questions about the strength of election candidates before or after they measured general voting intentions. They then measured the impact of question order on the observed correlation between answers to specific questions and general voting intentions. We argue that the measurement of intentions makes presurvey latent intentions relatively more accessible and diagnostic than it does other antecedents of behavior, which strengthens the relationship between presurvey latent intentions and postsurvey behavior. Therefore, we represent self-generated validity in Figure 2 by the β_3 parameter, or the effect that S has on the link between LI and B.

This broader definition enables us to test for self-generated validity effects among latent (nonmeasured) and observed (measured) constructs and not only between observed constructs, as in Simmons, Bickart, and Lynch's (1993) study. It also excludes social norms and intention-modification effects, both of which imply that the surveying of intentions increases purchase behavior independent of prior latent intentions and that the relationship between prior latent intentions and behavior remains the same. However, these other sources of measurement reactivity lead to an increase in purchase behavior, regardless of prior latent intentions. Therefore, in Figure 2, we represent their effects by the β_2 parameter, which captures the effect of S on B and is not mediated by the strengthening of the relationship between LI and B.

Model Estimation

The right-hand side of the latent model in Figure 2 can be expressed as the following latent equation:

$$(1)\qquad B = \alpha_1 + \beta_1(LI) + \beta_2(S) + \beta_3(LI)(S) + \varepsilon,$$

where B is the future purchase behavior of interest, LI is latent purchase intentions, S is a binary variable that indicates whether intentions are surveyed, ε is the error term that captures random disturbance, and α_1, β_1, β_2, and β_3 are parameters to be estimated.

Parameter interpretation. In Equation 1, the β_3 parameter of the interaction between S and LI on B captures self-generated validity effects. When S is coded as .5 for surveyed consumers and –.5 for nonsurveyed consumers, we expect β_3 to be positive, which indicates a higher association between LI and B for surveyed consumers than for similar nonsurveyed consumers.

As Irwin and McClelland (2001) explain, the β_1 and β_2 coefficients of the LI and S variables capture the simple effects of each variable when the other variable involved in the interaction is zero. Therefore, the β_1 parameter captures the mean effect of LI on B across both surveyed and nonsurveyed consumers. Because LI are scaled according to MI, the interpretation of the β_2 parameter depends on whether MI are measured on a bipolar or a unipolar scale.

When purchase intentions are mean-centered and measured on a unipolar scale (e.g., a timed intent scale ranging from "intend to buy immediately" to "will never buy"), the β_2 parameter captures the effects that measurement has for consumers with average LI. However, when purchase intentions are measured on a bipolar interval scale with a neutral point (e.g., 3 on a five-point scale, where 1 = "completely disagree" and 5 = "completely agree") and are centered on this neutral midpoint, β_2 captures the effect of measurement on the purchase behavior of consumers with neutral purchase intentions. In other words, β_2 measures the sources of measurement reactivity that are due not to self-generated validity but rather to social norms or intention modification. (This is because making a neutral purchase intention more accessible or more diagnostic should not influence behavior.) Any differences in purchase behavior between surveyed and nonsurveyed consumers with a neutral intent to buy cannot be explained by self-generated validity effects and therefore must be attributable to these other explanations.

This interpretation of β_2 requires a set of assumptions. First, the construct of interest is valenced (i.e., can be positive, negative, or neutral), which is not problematic if the construct of interest is attitude or satisfaction, both of which are valenced constructs. Many studies of purchase intentions also assume that intentions are valenced, at least implicitly (e.g., when the studies measure intentions on a bipolar Likert scale). This assumption is inconsistent with Fishbein and Ajzen's (1975) definition of behavioral intentions as a probability, or a unipolar concept. Second, all consumers view answering at the midpoint of a valenced scale (e.g., "neither agree nor disagree") as a neutral, nonvalenced intention (i.e., consumer heterogeneity with respect to this perception is evenly distributed). This assumption is problematic, for example, in cross-national research in which there should be strong differences in response styles across countries. However, note that none of these assumptions is required to interpret β_3, the main coefficient of interest, which captures self-generated validity effects regardless of whether the intentions are measured on a bipolar or a unipolar scale.

Two-stage estimation. The difficulty of estimating Equation 1 is that LI is an unobserved latent variable, but fortunately we can estimate such a model using a two-stage approach (Bollen 1996; Bollen and Paxton 1998). As we detail in the Appendix, we can substitute LI in Equation 1 with MI – δ_{MI} to obtain an equation with only observed variables. Because MI is correlated with the new composite disturbance term (μ), which now includes δ_{MI}, ordinary least squares (OLS) cannot estimate the modified Equation 1. In addition, MI is missing for the control group of consumers who did not answer the survey.

To overcome these obstacles, we regress MI on the other indicators of LI (RI_1, RI_2, $\ldots$, RI_n, FI_1, FI_2, $\ldots$, FI_m) using data from the survey group. These other indicators serve as instrument variables for MI because they are correlated with LI but not with δ_{MI} (and therefore not with the new composite disturbance term in Equation 1). We then use the fitted parameters of this regression to substitute MI into Equation 1 with its predicted value $\hat{MI}$ in both the survey and the control groups. Because $\hat{MI}$ is a linear combination of variables that are not correlated with μ, $\hat{MI}$ is not correlated with μ. Thus, we can use an OLS regression to estimate the modified equation, including $\hat{MI}$.

Simulation analyses. To estimate the model in Figure 2 and Equation 1, we must assume that (1) multiple indicators of LI are available, (2) MI are unbiased indicators of LI that are unaffected by social norms or intention modification, and (3) surveyed and nonsurveyed consumers are identical (i.e., there are no selection biases). We tested the importance of each assumption by conducting extensive simulations, which also enabled us to estimate the ability of the two-stage procedure to recover the true effects of LI on B for surveyed and nonsurveyed consumers when these assumptions were not satisfied. Specifically, we manipulated the quality of the other indicators of LI (factor loadings ranging from .3 to .9), the presence of positive reporting biases in MI (e.g., those caused by social norms or intentions modification), and the presence of selection biases (only positively inclined consumers agree to answer the survey). We find that the β_3 coefficients estimated with the two-stage procedure are stable even in the extreme scenario of reporting or selection biases combined with poor indicators of LI. In addition, these problems inflate the standard errors of the coefficients and work against our hypotheses. Overall, the simulation analyses show that the two-stage procedure can estimate self-generated validity effects reliably even in imperfect measurement and experimental conditions. (The complete results of the analyses are available from the authors on request.)

Summary

The latent model enables us to broaden our definition of self-generated validity effects to include the effects that measurement has on the relationship between latent and measured constructs. We show that with a two-stage procedure, we can estimate (1) the latent purchase intentions of nonsurveyed consumers, (2) the impact of the measurement of intentions on the relationship between latent intentions and behavior (self-generated validity effects), and (3) the impact of the measurement of intentions on the behavior of consumers with neutral intentions (social norms and intention-modification effects).

Quantifying Self-Generated Validity and Other Sources of Measurement Reactivity: Three Field Studies

In this section, we quantify self-generated validity and other sources of measurement reactivity through three large-scale studies of intended and actual purchases of groceries, automobiles, and PCs. The three field studies differ significantly in terms of the sampling frame, the type of purchase behavior studied, and the measurement of intentions and behavior, but they all contain information about purchasing from two groups of consumers: those whose purchase intentions were measured and a control group of similar consumers whose purchased intentions were not measured. Therefore, we describe the three studies and their results collectively.

Data

Grocery study. In this study, we measured consumers' intentions to repurchase from an online grocer. The data (for a detailed description, see Chandon, Morwitz, and Reinartz 2004) were gathered from a field study conducted in collaboration with a leading French Web-based grocer that offers online an assortment that is typical of a large supermarket (50,000 stockkeeping units of food and some durable products) and nationwide delivery. During the last week in May and the first week in June 2002, 251 customers were contacted by telephone and asked about their intent to repurchase from the online grocer in the future. The respondents were chosen at random from customers who had made their first purchase with the online grocer in October or November 2001. The data set contained demographic information about the age, number of children, and number of pets of each customer, as well as detailed transaction data for all their purchases between January 2001 and April 2002 (i.e., nine months before and nine months after the survey). Transaction data included the date of the order, the quantity and price of each ordered product, and the total profit that the online grocer made. The same data were available for a control group of 140 consumers who were randomly selected from the same cohort but whose purchase intentions were not measured.

To obtain reliable indicators of purchase intentions, we measured consumers' agreement with two statements (translated from French): "I am thinking of using [name of grocery company] for my next online purchases," and "I am thinking of remaining a customer of [name of grocery company] for a long time." We measured the statements on a five-point Likert scale, where 1 = "completely disagree" and 5 = "completely agree." We averaged the answers to produce a reliable intention scale (Cronbach's $\alpha = .86$). Because we surveyed existing buyers, in general the intention scores were above the midpoint (mean = 3.86, standard error [S.E.] = 1.19, $p < .01$) and somewhat negatively skewed (skewness = –1.13). However, there was enough variance in the measures to test for self-generated validity effects (26% of consumers had negative to neutral [i.e., below 3] intentions to purchase).

For the grocery study, we examined two dependent variables: purchase incidence and customer profitability. We chose purchase incidence to facilitate comparisons with our other two studies and with previous measurement-reactivity research and to examine the effects of the measurement of intentions on the consumers' first repurchase after the survey. Using a binary variable, we determined whether the consumer placed at least one order halfway through the postsurvey period (just more than four months after the survey). We chose this time horizon because self-generated validity theory predicts, and prior research demonstrates, that the effects of the measurement of purchase intentions decay over time (Chandon, Morwitz, and Reinartz 2004).

We studied cumulative customer profitability because it includes information about the first and subsequent repurchases that the customer made. In addition, it is the most important measure for managers, and prior research has shown that one-time transactional gains do not necessarily lead to improved customer profitability for the company, especially for commonly purchased consumer goods (Reinartz and Kumar 2000). We measured total customer profitability as the cumulative net profit attributable to the customer (i.e., the sum of the contribution of all orders placed in the nine-month postsurvey period less coupons and delivery costs). Because the company routinely surveys its customers and would continue to do so even in the absence of measurement-induced purchases, we treated the cost of administering the survey as a fixed cost and did not subtract it from the cumulative contribution of surveyed customers. We used the full postsurvey period because we measured cumulative profits, which include the first and subsequent purchases. Although the effects of measurement decay over time, the positive impact of the first purchase carries through to subsequent purchases; therefore, measurement-reactivity effects persist over time on cumulative customer profitability (Chandon, Morwitz, and Reinartz 2004).

Automobile and PC studies. The other two data sets refer to the automobile and PC data that Morwitz, Johnson, and Schmittlein (1993) use and describe. Intentions to buy and ownership of home PCs and automobiles were measured using two different but similar U.S. consumer mail panels. Both panels were designed to be representative of U.S. households, according to census data, and each panel comprised approximately 100,000 households. Intentions and behavior were measured during seven survey waves, each approximately six months apart. The surveys requested that the person in the household who was most involved in the purchase decision complete the survey. In each survey wave, panel households were asked to provide their timed intentions for buying an automobile or PC in the future. Extensive demographic information about the panel households also was collected, including the size of the household, annual household income, age of the head of the household, marital status, home ownership, household stage of life, occupation, education of the head of the household, race, number of cars owned, and regional dummy variables.

In contrast to the grocery data, for which consumers were randomly selected to be surveyed, Morwitz, Johnson, and Schmittlein's (1993) data for both products reflect the results of naturally occurring or quasi experiments. Because of panel dynamics (members entering and exiting a panel over time), panel members varied in whether and how often their intentions were measured. For both products, we compared the behavior of panel members who entered the panel only in time to receive the intentions question in the sixth survey wave with the behavior of those who joined the panel after the sixth but before the seventh wave and thus whose intentions were not measured in the sixth wave. As in Morwitz, Johnson, and Schmittlein's research, to control for any differences in the experimental and control groups due to factors other than the experiment, we weighted the data by two different criteria: stage in the life cycle and age of the head of the household. Because the results for both weighting schemes are similar, we report only the results for weighting by life cycle.

For the automobile data, the intention question asked, "When will the next new (not used) car (not truck or van) be purchased by someone in your household?" The following response alternatives were provided: 1 = "6 months or less," 2 = "7–12 months," 3 = "13–24 months," 4 = "25–36 months," 5 = "over 36 months," and 6 = "never." We reverse coded the responses so that higher numbers represent a higher intention to repurchase, which is consistent with the grocery data (mean = 2.36, S.E. = .027, $p < .01$, skewness = −.74). During each survey wave, respondents also were asked whether they had purchased a new automobile during the previous period. For the automobile study, we analyzed data from 8347 households, 3571 whose intentions were measured and 4776 whose intentions were not measured.

The PC data are similar in format to the automobile data. The intention question asked, "Do you or does anyone in your household plan to acquire a (another) personal computer in the future for use at home?" The following response alternatives were provided: 1 = "yes, in the next 6 months", 2 = "yes, in 7 to 12 months", 3 = "yes, in 13 to 24 months", 4 = "yes, sometime, but not within 24 months", 5 = "no, but have considered acquiring one", and 6 = "no, will not acquire one." We also reverse coded these responses (mean = 2.03, S.E. = .028, $p < .01$, skewness = −1.47). In each wave, respondents indicated whether they had purchased a computer in a given time period. As do Morwitz, Johnson, and Schmittlein (1993), we restricted our analysis to households that initially did not own a PC, and we assumed that a household bought a PC if it switched from being a nonowner to being an owner from one wave to the next. There were 7772 households in the data, 2138 whose intentions were measured and 5634 whose intentions were not measured.

For both the PC and the automobile data, we examined only purchase incidence (i.e., whether a purchase occurred in the six-month period following the intent measurement). Because intentions were measured during every survey wave, a longer-term analysis would confound duration with the number of times intentions were measured.

First-Stage Regressions

Predicting purchase intentions in the control group. In all three studies, we used demographic and behavioral indicators of LI as the instrument variables to predict MI in both the survey and the control groups. To select the instrument variables, we measured their predictive power by splitting the survey group into two random samples, regressing MI on the instrument variables, and then using the regression to predict intent in the second sample. As Armstrong and Collopy (1992) recommend, for both random samples, we selected the combination of variables with the best predictive accuracy and measured it with the median average percentage error (MdAPE) and the median relative absolute error (MdRAE). We obtained the MdRAE by dividing the median of the absolute forecast error by the corresponding error for the naive model, so we assigned the average MI of the survey group to all consumers in the control group. We then reestimated the best model of the MI for the full sample of consumers in the survey group and used the parameters from the regression to predict purchase intentions for both the survey and the control samples. To check the robustness of the final results for the choice and quality of the instrument variables, we tried several different predictions of intent that provided similar to significantly worse predictive power. The results were virtually unchanged.[1]

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[1] We computed predicted purchase intentions for the grocery study as follows: $\hat{MI} = 5.467 - .00321(REC) - .03067(AGE) +$

Across the three studies, we can predict purchase intentions moderately well For the grocery data, MdAPE = 16 and MdRAE = 95, for the PC data, MdAPE = 087 and MdRAE = 78, and for the automobile data, MdAPE = 17 and MdRAE = 54 For both the PC and the automobile data, the error rates were similar when we used weighting methods to ensure equivalence between the survey and the control groups

Method checks and descriptive results As we expected, predicted purchase intentions were similar for surveyed and nonsurveyed consumers across all three studies (see Table 1) The difference between the groups was not statistically significant for the grocery study but was statistically significant for the automobile and PC studies, this is probably due to the larger number of observations in the latter studies (n = 8306 for the automobile study, n = 7772 for the PC study) The finding that predicted that purchase intentions are lower in the survey group than in the control group (as in two of three cases) helps rule out selection biases, which would cause consumers with higher LI to be more likely to appear in the survey group Overall, the results indicate that surveyed and nonsurveyed consumers are similar and that the measurement of their purchase intentions causes the differences between their purchase behavior

As Table 1 and previous studies with these data (Chandon, Morwitz, and Reinartz 2004, Morwitz, Johnson, and Schmittlein 1993) show, in general the measurement of purchase intentions increases the purchase incidence for grocery, automobile, and PC products (Note that the PC data are marginally significant on the basis of a one-tailed test, as Morwitz, Johnson, and Schmittlein [1993] report) In Table 1, we show that the variance in future behavior is lower in the control groups than in the survey groups for all studies and dependent variables (though the difference is not statistically significant in the PC study) This new result, which previous measurement-reactivity studies have not explored, is consistent with the self-generated validity theory, which argues that the measurement of a person's intention to perform a behavior, not other factors (e g , mood, price promotions), increases the likelihood that he or she will act on this behavior If we assume that the other factors cancel out, self-generated validity theory predicts that the purchase behavior of people in the control group will regress to the mean, which explains the lower variance in the control group Alternatively, purchase intentions may cause more variance in behavior when they are made salient by measurement because they magnify the differences between people with high and low intentions As we report subsequently, the variance differences have implications for the selection of the correct method to test for self-generated validity effects

Second-Stage Regressions

Variable coding We used the predicted purchase intentions that we estimated in the first stage to estimate the regression represented in Equation 1 in accordance with the procedure we detail in the Appendix For the automobile and PC studies, whose timed measures of purchase intentions have no neutral point, we mean-centered the predicted purchase intentions ($\widehat{MI}$) to zero when they measure 2 36 (automobile) and 2 04 (PC) However, for the grocery study, we measured purchase intentions on a five-point Likert scale (1 = "completely disagree" and 5 = "completely agree"), and therefore the neutral midpoint is 3 ("neither agree nor disagree") To estimate the effects of the measure-

TABLE 1
Method Checks and Descriptive Results (Mean and Standard Deviation)

Study	Variable	Control Group	Survey Group
Grocery	Number of observations	140	251
	Predicted purchase intentions (1–5)	3 91 (43)	3 86 (41)
	Repeat purchase incidence	229 (421)	331* (471)*
	Customer profitability (€)	19 53 (42 27)	27 43 (57 08)**
Automobile	Number of observations	4776	3530
	Predicted purchase intentions (1–6)	2 25 (768)	2 52** (798)**
	Purchase incidence	024 (153)	033* (178)**
PC	Number of observations	5634	2138
	Predicted purchase intentions (1–6)	2 05 (456)	2 02* (468)**
	Purchase incidence	038 (191)	045 (207)

*$p < 05$
**$p < 01$ (all tests two-tailed)
Notes Standard deviations (in parentheses) are compared according to Levene's F-test

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34831(PET) – 40852(BABY), where REC is purchase recency (number of days since the latest purchase), AGE is the customer's age, and BABY and PET are dummy variables that indicate that the household has at least one child or one pet For the automobile study, $\widehat{MI}$ = 5 56050 – 1 38433(EDUCATION1) – 1 70868(EDUCATION2) – 1 38598(EDUCATION3) – 1 37272(EDUCATION4) – 1 20131(EDUCATION5) – 1 22879(EDUCATION6) – 00828(INCOME) – 46495(MANAGER) – 28947(TECH) + 09822(SERVICE) – 06099(FARM) + 06992(CRAFT) + 08894(OPERATOR), where EDUCATION1–6 are dummy variables that represent different levels of the education of the head of the household, INCOME is total household income, and MANAGER, TECH, SERVICE, FARM, CRAFT, and OPERATOR are dummy variables that represent different occupations of the head of the household For the personal computer study, $\widehat{MI}$ = 4 42389 + 01317(HH_AGE) – 28590(NEWHH) – 12844 (NEWBB) – 17102(LOWMIDF) – 62929(UPSCALE) – 04337(MIDAGE) + 29444(LOWMIDE), where HH_AGE is the age of the head of the household, and NEWHH, NEWBB, LOWMIDF, UPSCALE, MIDAGE, and LOWMIDE represent mutually exclusive levels of the customer life-cycle variable that the survey company created ment of purchase intentions for consumers with neutral purchase intentions, we centered $\widehat{MI}$ on the midpoint so that it equals zero when predicted purchase intentions measure 3 Finally, we coded the binary variable S, which captures the effect of intentions measurement, as 5 for consumers in the survey group and – 5 for consumers in the control group We report the results (parameter estimates and standard error) of the second-stage regression in Table 2

Model results As we show in Table 2, consumers with higher LI are more likely to purchase in all three studies and are more profitable for the firm in the grocery study (the β_1 coefficients are all positive and statistically significant) Therefore, we replicate prior studies' findings that purchase intentions are a strong but imperfect predictor of purchasing In addition, we find the expected interaction between latent intentions and intention measurement for all three studies and all dependent variables (the β_3 coefficients are all positive and statistically significant) Thus, LI are stronger predictors of the behavior of surveyed consumers than of nonsurveyed consumers In other words, the measurement of purchase intentions strengthens the associations between latent purchase intentions and purchase behavior or customer profitability, this is a self-generated validity effect

Finally, the β_2 coefficients, which capture the simple effects of the purchase intentions survey, are positive and statistically significant for the automobile and PC studies, thus, the measurement of purchase intentions increases future purchasing by consumers with average latent purchase intentions Our two-stage method replicates previous findings from the same data that were obtained using different methods However, for the grocery study, the β_2 coefficients for repeat purchase and customer profitability are not statistically different from zero, which demonstrates that the measurement of purchase intentions does not increase the purchases or profitability of consumers who have neutral latent purchase intentions[2] Therefore, measurement reactivity in the grocery study is entirely mediated by self-generated validity effects

Separate analyses for surveyed and nonsurveyed consumers We performed the following analyses to obtain a more intuitive grasp of the magnitude of self-generated validity effects We computed the correlation between predicted intentions and behavior in each group, for each study, and for each dependent variable As we report in Figure 3, the results show that self-generated validity effects are great On average, the correlation between intentions and behavior is 58% greater in the surveyed groups than in the control groups In addition, the magnitude of the self-generated validity effects is approximately constant across all studies and dependent variables, regardless of the intensity of the true association between intentions and behavior (which varies between 07 in the automobile study and 26 in the grocery study)

To further illustrate the magnitude of self-generated validity effects, we regressed purchase behavior on predicted purchase intentions separately in the survey and control groups As we show in Table 3, unstandardized regression coefficients for predicted purchase intentions are 76% greater in the survey groups than in the control groups For example, a one-point difference in predicted purchase intentions (measured on a five-point scale) in the grocery study leads to a €52 71 gain in customer profitability when intentions are measured but only €23 95 when intentions are not measured Similarly, although predicted purchase intentions are reliable predictors of purchase behaviors in all studies, the t-values are, on average, 70% greater in the survey groups than in the control groups Taken together, the results show that the external accuracy of purchase intentions is significantly weaker and less reliable than is their internal accuracy and that we cannot extrapolate one from the other

In Figures 4 and 5, we provide another perspective on the results by reporting the purchase behavior of three equal groups of consumers with low (<32nd percentile), moderate (33–66th percentile), and high (>67th percentile) predicted purchase intentions In the grocery study (Figure 4), we find that the measurement of purchase intentions increases the repeat purchase incidence and customer profitability for high and moderate (positive) intenders but decreases both behaviors for low intenders, who have mostly negative intentions The purchase-incidence findings from the automobile and PC studies (see Figure 5) replicate the same pattern Overall, the pattern of results in Figures 4 and 5 matches the hypothetical self-generated validity effects

TABLE 2
Output of Second-Stage Regression (Unstandardized Regression Coefficients and Standard Errors)

Study	Purchase Behavior	Prior Latent Intentions (β_1)	Survey (β_2)	Interaction (β_3)
Grocery	Repeat purchase incidence	38** (05)	– 11 (10)	26** (11)
	Customer profitability	39 32** (6 20)	–13 70 (12 17)	26 78* (12 39)
Automobile	Purchase incidence	02** (00)	06** (02)	01** (00)
PC	Purchase incidence	06** (01)	01* (01)	02* (01)

*p < 05
**p < 01 (all tests two-tailed)

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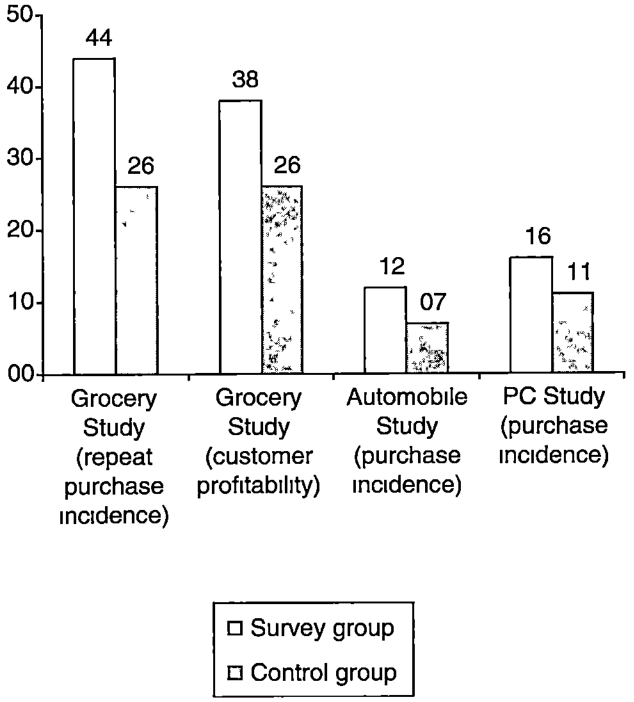
[2] If we mean-center predicted purchase intentions instead of centering them on the midpoint of the scale (3), the β_2 coefficients become positive and statistically significant for repeat purchase (β_2 = 12, S E = 04, p < 01) and, to a lesser extent, for customer profitability (β_2 = 9 73, S E = 5 16, p < 10) Using this coding, we replicate the descriptive results that we present in Table 1 The measurement of purchase intentions increases the purchasing and profitability of consumers who have average or, in this case, positive (mean = 3 86) purchase intentions, which is fully consistent with the predictions of self-generated validity theory

FIGURE 3
Correlation Between Predicted Purchase Intentions and Behavior in Three Field Studies



shown in Figure 1 for all three studies and all dependent variables

General Discussion

Because purchase intentions are widely used but are imperfect indicators of actual purchasing, a large body of research is devoted to improving their internal accuracy (the ability to predict the behavior of consumers from their previously measured intentions) However, we contribute to this literature by studying the external accuracy of measured intentions (i e , their ability to predict the behavior of consumers whose intentions are not measured) We develop a comprehensive latent model of the reactive effects of the measurement of purchase intention in which we distinguish between two sources of measurement reactivity The first is self-generated validity effects, which we define as a strengthened relationship between the measured latent construct and its behavioral consequences Thus, self-generated validity effects increase the likelihood that consumers will follow their intentions The theory behind these effects predicts that the measurement of intentions makes high intenders more likely to purchase and low intenders less likely to purchase but does not change the behavior of consumers with neutral intentions The second source includes measurement effects that are independent of intentions, such as those created by social norms or intention modification Unlike self-generated validity effects, the effect of social norms and intention modification influence the behavior of all consumers, regardless of their prior intentions

We provide a two-stage procedure, which enables us to quantify the magnitude of the self-generated validity effects and other sources of measurement reactivity In the first stage, we estimated the relationship between measured intentions and other indicators of latent intentions, using data from surveyed consumers We then used the fitted parameters from our analysis to predict the latent purchase intentions of both surveyed and nonsurveyed consumers In the second stage, we compared the strength of the association between our predicted intentions and actual behavior across both groups Using data from three large-scale field studies with control groups, we find that the measurement of purchase intentions increases the association between latent intentions and purchase behavior The effects are significant and robust across a variety of purchase behaviors, sampling frames, and ways to measure intentions and behavior In addition, one study shows that the measurement of purchase intentions does not influence the purchases of consumers who have neutral purchase intentions, which suggests that self-generated validity effects cause all the reactive effects of measurement The results have implications for both applied and academic research

Managerial Implications

The obvious implication of our results is that commonplace procedures and models (e g , ACNielsen's BASES model) that measure the intentions and behavior of the same sample of consumers overestimate the strength of their association For most tested concepts, which elicit positive intentions in general, the models overstate aggregate purchase probabilities Therefore, our results strongly call into question the common practice of extrapolating to the general population

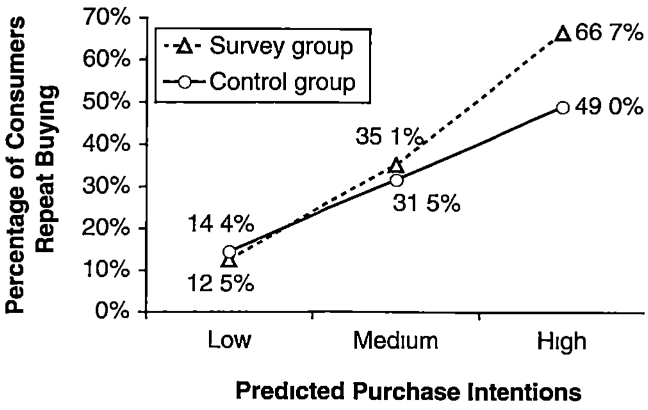
TABLE 3
Association Between Latent Purchase Intentions and Future Behavior in the Control and Survey Groups (Unstandardized Regression Coefficients and t-Values)

Study	Purchase Behavior	Control Group	Survey Group
Grocery	Repeat purchase incidence	25 (3 11)	51** (7 81)
	Customer profitability	25 93 (3 18)	52 71* (6 40)
Automobile	Purchase incidence	015 (5 13)	028** (7 39)
PC	Purchase incidence	048 (8 71)	069* (7 35)

*$p <$ 05
**$p <$ 01 (all tests two-tailed)
Notes Regression coefficients are compared with a Chow test (grocery $F_{1, 389}$, automobile $F_{1, 8302}$, PCs $F_{1, 7768}$)

FIGURE 4
Surveyed and Nonsurveyed Consumers with Three Levels of Predicted Purchase Intentions (Grocery Study)

A: Repeat Purchase Probability



B: Customer Profitability

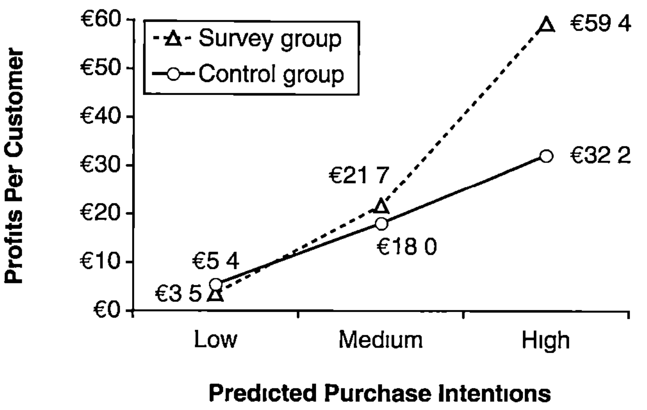
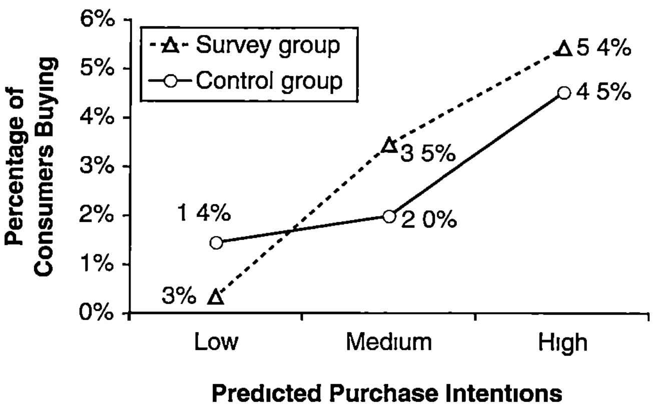
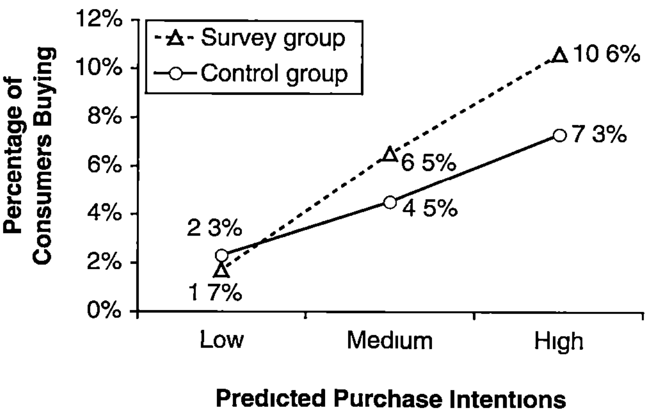


FIGURE 5
Purchase Probability of Surveyed and Nonsurveyed Consumers with Three Levels of Predicted Purchase Intentions

A: Automobile



B: PC



the conclusions of studies that measure the intentions and behaviors of the same consumers When choosing the best measure of purchase intentions or the best method to predict behavior from intentions, marketers should focus on the external, not internal, validity of the measure and the method

For example, there has been a recent debate in the *Harvard Business Review* about the merits of different measures of customer feedback Reichheld (2003) argues in favor of measuring consumers' willingness to recommend the product, because he claims that it is the best predictor of future purchasing However, this conclusion is based on a comparison of the predictive accuracy of different measures of customer feedback that are tested on surveyed consumers only Our results suggest that marketers who are interested in selecting the measure that best predicts future purchasing should use our method to determine whether it predicts the behavior of nonsurveyed consumers

Our results also emphasize the importance of investigating the sources of measurement-reactivity effects Knowing whether self-generated validity or other measurement effects drive the behavioral differences between surveyed and nonsurveyed consumers has implications for the improvement of forecasting and targeting For example, Jamieson and Bass (1989) describe multiple conversion schemes that marketers use to forecast purchase behavior from intentions These conversion schemes are obtained by analyzing the behavior of consumers whose intentions have been measured A scheme that Jamieson and Bass describe is 75%–25%–10%–5%–2% for each purchase-intention box (e g , 75% of consumers who state that they would "definitely buy" actually do so, 25% of consumers who state that they would "probably buy" actually do so) If social norms or intention modification causes the reactive effects of measurement, these weights are inflated and should be reduced by a constant (e g , the correct weighting scheme might be

60%–10%–0%–0%–0%) In this case, marketers should consider narrowing their target to focus only on consumers who have strong positive purchase intentions, because they are the only ones likely to purchase However, if self-generated validity causes measurement reactivity, conversion rates should be regressed toward their means (e g , the correct weighting scheme might be 60%–20%–15%–10%–8%) This flatter purchasing profile implies that marketers should broaden their target to encompass consumers who have negative purchase intentions because they are more likely to purchase than the conversion rates, which are determined by the measurement of surveyed consumers, suggest

Research Implications

An area for further research is to relax the assumption that all consumers have some form of prior latent intention before the survey For our research, it is reasonable to assume that an existing customer of a Web grocer has formed a repurchase intention or that a U S consumer would have an intention to buy an automobile or PC However, as Feldman and Lynch (1988) argue, a segment of the population may form an intention only when asked about it Although it would violate a main assumption of the model, we expect that our procedure would still be able to detect self-generated validity effects even if a sizable segment of consumers did not have a latent intention Suppose the sample consists of a probability mixture of two groups, one lacking prior latent intention and one with latent intention Then suppose that intention measurement causes a latent intention among respondents who did not previously have one and makes them more likely to follow this new intention Finally, suppose that there is no change in the strength of the relationship between latent intentions and behavior for people in the group with preexisting latent intentions The first stage of our two-stage procedure would incorrectly assign a purchase intention to the segment of consumers in the control group who have none However, because the purchase behavior of these consumers remains independent of this predicted intention, in the second stage of the procedure, we would find that the association between the control group's latent intentions and behavior is small and different from the association between the intentions and behavior in the survey group Thus, we believe that our estimation procedure is capable of detecting self-generated validity effects even in cases in which latent intentions do not exist before measurement[3]

Our study relates to previous studies that have demonstrated that measurement-related biases can lead to incorrect inferences about the strength of the relationship between two measured marketing constructs and therefore have developed corrective techniques (Baumgartner and Steenkamp 1992, Rossi, Gilula, and Allenby 2001) For example, Greenleaf (1992) investigates how different response biases affect the relationship between self-reported attitudes and behavioral frequencies For a large battery of behaviors, he develops a method to detect whether response styles reflect true attitude differences, in which case researchers should not adjust for them, or are biased, in which case researchers should adjust for them A fruitful area for additional research would be to integrate the methods and findings from that stream of research with our method for the estimation of latent constructs among respondents for whom the constructs were not measured[4]

The method we offer helps measure and correct for self-generated validity effects in many research contexts, including laboratory experiments and field observations, and for many constructs, including beliefs, attitudes, and satisfaction When self-generated validity effects are possible, researchers should collect data about the criterion (e g , behavior) of a control sample of consumers who did not answer the survey as well as multiple indirect measures of the target explanatory constructs (e g , intentions, attitudes) that the survey does not influence (e g , behavioral or demographic data that is measured with a different method than that used to measure the explanatory and criterion variables) With this information, researchers should be able to predict the level of the explanatory construct for a control group of consumers who did not answer the survey and to measure the link between the predicted and the criterion variables

For example, this method could clarify inconsistencies between survey results and the behavior of the general population, such as in contingent valuation surveys for environmental policies or products (Irwin 1999) It also could examine the consequences and antecedents of latent, as opposed to measured, satisfaction In particular, the estimation of the true association between latent satisfaction and customer lifetime value could contribute to the debate about the value of improving customer satisfaction (Bolton 1998, Kamakura et al 2002) In general, we believe that any research that uses a survey that goes beyond description and examines the association between constructs can benefit from our method for testing for self-generated validity and other sources of measurement reactivity

Appendix

We briefly describe the two-stage least squares estimator that Bollen (1996) introduces The two-stage least squares estimator is consistent, allows nonnormal observed and latent variables, enables easy estimation of interaction effects, and has been used in many applications (for a review, see Schumacker and Marcoulides 1998)

The structural equation model represented in Figure 1 consists of a latent variable model (described in the text) and a measurement model, which can be expressed as follows

(A1) $$\text{MI} = \text{LI} + \delta_{\text{MI}}, \text{ and}$$

$$\text{RI} = \alpha_{\text{RI}} + \lambda_{\text{RI}}(\text{LI}) + \delta_{\text{RI}},$$

where MI is measured intent as provided by the survey, LI is a latent variable that measures intent just before the time of the survey without error, RI is another reflective indicator of prior latent intent (the model can easily accommodate more indicators), α_{RI} is an intercept, and δ_{MI} and δ_{RI} are the two disturbance variables Equation A1 shows that MI is set to have the same metric and origin as LI (by setting the intercept to zero and the factor loading to one) to provide a scale for the latent variable

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[3] We thank an anonymous reviewer for noting that our method would also work in this circumstance

[4] We thank the editor for noting the relationship between our work and previous research on calibration

It is likely that some of the other indicators of prior latent intent are formative We can express the relationship between a formative indicator (FI) and LI as follows

$$\text{(A2)} \qquad LI = \alpha_{FI} + \lambda_{FI}(FI) + \zeta_{FI},$$

where ζ_{FI} is another disturbance term We can extend Equation A2 to multiple formative indicators Following the traditional assumptions of structural equation modeling, we assume that δ_{MI} and δ_{RI} are independent of LI and of each other and that LI, δ_{MI}, δ_{RI}, ζ_{FI}, and ε are each i i d random variables We also assume that δ_{MI}, δ_{RI}, ζ_{FI}, and FI are independent of S (a binary variable that measures whether consumers were surveyed)

Equation A1 shows that LI = MI – δ_{MI} Substituting LI with MI – δ_{MI}, we obtain the following

$$\text{(A3)} \qquad B = \alpha + \beta_1(MI) + \beta_2(S) + \beta_3(MI)(S) + \mu,$$

where B is the future behavior of interest (purchase incidence, customer profitability), and μ is a composite disturbance

$$\text{(A4)} \qquad \mu = \varepsilon - \beta_1(\delta_{MI}) - \beta_3(S)(\delta_{MI})$$

Equation A3 shows that the original latent variable model in Equation 1 can be rewritten as a model with only observed variables and a disturbance term μ Because of measurement error, MI and δ_{MI} are correlated, and thus MI is correlated with the composite disturbance term μ, which violates the assumptions of the OLS estimator Therefore, we must replace MI with an instrument variable that is correlated with MI but not with δ_{MI} Other indicators of prior latent intent, whether reflective or formative, can be used as instrument variables in a two-stage procedure because they are not correlated with δ_{MI} and because, as other measures of latent intent, they are correlated with LI

In the first stage, we regress MI on n other reflective indicators of LI (RI_1, RI_2, , RI_n) and on the m other formative indicators of LI (FI_1, FI_2, , FI_m), using data from the survey sample In the second stage, we replace MI with its predicted value ($\widehat{MI}$) in both samples We then obtain the following equation

$$\text{(A5)} \qquad B = \alpha_1 + \beta_1(\widehat{MI}) + \beta_2(S) + \beta_3(\widehat{MI})(S) + \mu$$

Because $\widehat{MI}$ is a linear combination of instrument variables (RI_1, RI_2, , RI_n, FI_1, FI_2, , FI_m), it is uncorrelated with δ_{MI} and ε and thus with μ Therefore, Equation A5 can be estimated through a regular OLS regression to obtain β_1, β_2, and β_3, the parameters of interest

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Birger Wernerfelt

Product Development Resources and the Scope of the Firm

This article examines the relationship between a firm's strength in product development and its optimal scope Firms with product development strength have two options They can leverage it in horizontally related markets, and they can reach into the supply chain to take full advantage of it The question is how this should be done One possibility is for the firm to expand its scope, and another is to manage the linkage through contracts On the basis of the adjustment cost theory of the firm, the author argues that the former solution is more appropriate when product development is fast-paced This study tests the argument in a sample of several thousand firms and reports four tests For both types of expansion, the author examines the incidence and the productivity of increased scope The author uses several measures and finds results that are consistent with the theory

Several recent studies on marketing strategy have used the resource-based view (RBV) of the firm (Wernerfelt 1984) as a theoretical lens (e g , Boulding and Christen 2003, Day 1994, Dutta et al 2002, Dutta, Narasimhan, and Rajiv 1999, Moorman and Slotegraaf 1999, Ofek and Sarvary 2003, Slotegraaf, Moorman, and Inman 2003) Much of this literature assumes that the resources in question should be leveraged inside the firm, though a few studies (e g , Rao, Qu, and Ruekert 1999) consider how to leverage a resource through a contract with another independent firm The current article asks, What does a specific set of resources—namely, those used in product development—imply for the optimal vertical and horizontal scope of the firm?

Expansions of the vertical and horizontal scope are similar insofar as both involve the firm's taking on more activities Firms have a broader vertical scope when they make, rather than buy, more of their inputs, and they have a broader horizontal scope (i e , they are more diversified) when they sell more lines of outputs Although I argue that both types of integration are positively correlated with product development resources, the proposed theoretical mechanisms are somewhat different I assume that the firm's original stock of resources is exogenous and, in accordance with the RBV, guides its choice of industry If the industry places a premium on flexibility in dealings with the supply chain, the adjustment cost theory of the firm (Wernerfelt 1997) suggests that the firm expand its vertical scope by bringing in part of the supply chain If the firm develops more resource capacity, the RBV suggests that the firm transfer any excess to other industries, but this view does not infer whether the firm should govern this transfer through a contract or horizontal expansion In contrast, the adjustment cost theory is silent with respect to whether this transfer should take place, but it recommends that a horizontal expansion should govern a transfer process if it entails frequent and diverse adaptations

The argument is independent of the nature of the firm's resources However, this article focuses on product development resources and presumes that a firm's use of such resources is correlated with a need for frequent and diverse adaptations, which is the central exogenous variable in the adjustment cost theory I am not claiming that all product development resources should lead to vertical and horizontal expansion or that other resources should not

I begin the argument by presenting two managerial challenges that many firms engaged in intensive product development face (1) how to manage the demands for flexibility in the supply chain that are brought on by changes in final product designs and (2) how to leverage the firm's ever-growing set of product development resources The ultimate claim is that firms sometimes meet these challenges by expanding their vertical and horizontal scope, respectively To lay the foundation for making this claim, I review some general theory about the scope of the firm I summarize the adjustment cost theory of the firm and argue that it provides a lens through which the expansion of vertical scope can be understood I then combine the adjustment cost theory with the RBV of the firm and use this combination to consider the expansion of horizontal scope Armed with these theories, I return to product development and formulate several hypotheses I present a preliminary empirical test and conclude the article with a discussion

Side-Effects of Product Development

In this section, I attempt to develop the context by describing two managerial challenges that firms may face when competing in industries characterized by fast-paced new

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Birger Wernerfelt is J C Penney Professor of Management Science, Sloan School of Management, Massachusetts Institute of Technology (e-mail bwerner@mit edu) The article benefited from comments by four anonymous *JM* reviewers and seminar participants at MIT and Yale and from helpful discussions with Ernst Berndt, Erik Brynjolfsson, and Duncan Simester

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product activity The empirical work reveals the extent to which the challenges are empirically important

Flexibility in the Supply Chain

The implementation of a new product design almost inevitably requires that some inputs be changed, and thus it has implications for the supply chain In many cases, the effects are quite widespread For example, changes in a single component of a mechanical or electronic product often necessitate changes in several others

The challenge occurs when the inputs are less standardized and procured under long-term contracts that must be renegotiated A change is not problematic if it involves standardized items that are traded on the spot market, because in that case, a firm simply stops buying one item and starts buying another item Similarly, if the changes take place at *ex ante* known times (e g , seasonally, annually), they pose less of a problem because a firm is unlikely to have entered into contracts that extend beyond the dates at which it anticipates changes However, it is unanticipated changes in needs for less-standardized inputs that present problems

There are many costs with respect to these changes, and firms can incur several of them *ex post* In particular, the firm must engage in difficult negotiations with the supplier, which is entitled to compensation for continued delivery of items that the firm no longer wants This bargaining process takes time and may fail (Myerson and Satterthwaite 1983) In addition, there are some *ex ante* costs of entering into a contract that both parties know they will eventually need to change The costs include attempts to withhold certain information from the trading partner (out of fear that it may be exploited at the time of renegotiation) and reductions in efforts due to the anticipated termination In some cases, the costs are borne, but in others, they are so large that a firm may postpone or even drop otherwise efficient changes

The managerial challenge is to keep the costs of change down while managing the trade-off between them and the disadvantages of delaying or abandoning improvements in design As such, the issues are similar to those discussed in the literature on improvisation in new product development (Moorman and Miner 1998) That is, the focus is on finding a process for managing unplanned changes The literature has suggested many avenues for dealing with the problems, often putting them in the categories of operational (Tang and Tikoo 1999) and strategic (Grewal and Tansuhaj 2001) flexibility This study is interested in just one of these solutions the possibility of using vertical integration to ameliorate the costs of unplanned change

Leveraging Accumulated Assets in Product Development Processes

Any firm that undertakes product development will develop resources over time that make repetition easier Part of this involves the firm's moving down the learning curve, and part of this involves channel partners' and consumers' coming to trust the firm To some extent, these resources accumulate automatically (Lieberman 1984), but firms can often manage their learning and reputation (e g , Hurley and Hult 1998, Hult, Ketchen, and Slater 2004)

The challenge that this article presents is associated with the resources that a firm can potentially apply beyond the industry of origin A firm will accumulate many resources that help it compete more effectively in its current industry However, some of the resources have potential value in other industries as well, perhaps not in all industries but at least in industries that are similar in some sense to the one in which they originated I confine attention to two classes of resources

The first class of such general resources is the "business-process experience," which pertains to the execution of the development process Some of the skills reside in individual employees, and others are of a more social nature (e g , the group learns to compromise and cooperate with respect to a set of issues related to product development) Examples include the elicitation of technical and commercial information, the integration of conflicting viewpoints, and the division of labor and authority in the group The individual components of learning may be quite small, but the aggregate learning-curve effects may be substantial

The second class of accumulating resources consists of a firm's "reputation" with members of the distribution channel and, ultimately, consumers If a firm has introduced successful new products in the past, retailers are much more likely to trust its new offerings, and consumers will react favorably to its brand name To illustrate the frequency with which this happens, Montgomery and Wernerfelt (1992) report that 83% of the products in their sample were umbrella branded

The managerial challenge is to deploy these two classes of resources in the best possible way When the resources are sufficiently large, it is rarely optimal to confine their use to the original industry Thus, the questions are where and how to put them to greater use and, in particular, whether this should lead to an expansion of the horizontal scope of the firm

Theory

In this section, I summarize the general theories used in the article I describe the adjustment cost theory of the firm and focus on its implications for the vertical scope of the firm Then, I outline the RBV of the firm and combine it with the adjustment cost theory to consider the expansion of the horizontal scope Finally, I examine the context of product development more narrowly and derive specific hypotheses

The Adjustment Cost Theory of the Firm

To make statements about the optimal scope of the firm, there must be a theory of how firms differ from markets There is no such generally accepted theory, but most candidates are descendants of Williamson's (1975) transaction cost analysis (TCA), insofar as they stress a subset of the factors invoked in TCA Variants of TCA have been used extensively in marketing, not only in studies of the choice between direct sales forces and independent representatives (Anderson 1985, Ghosh and John 1999, Klein, Frazier, and Roth 1990, Weiss and Kurland 1997) but also in more general contexts (Heide 2003, Jap 1999) Whereas most applications of TCA, including the property rights theory (Grossman and Hart 1986), have focused on the effects of specific investments, the current study stresses a different class of transaction costs Specifically, it uses the adjustment cost theory (Bajari and Tadelis 2001, Simester and Knez 2002, Tadelis 2002, Wernerfelt 1997, 2004) to compare the costs of adapting a trading relationship under firm governance rather than under market governance This theory examines ongoing trading relationships and asks by which process the parties should adjust the relationship by accommodating changes Possible processes include an *ex ante* contract that covers all possibilities and an *ex post*, case-by-case negotiation If the required changes are diverse and frequent, the theory predicts that an implicit contract in which one party is given decision rights and the other can quit at any time should govern the relationship The theory defines the latter governance structure as an employment relationship or a firm It is possible, but beyond the scope of this article, that other theories of the firm, including those based on specific investments, could be used to interpret the results For example, Rajan and Zingales (2001a, b) suggest that the RBV is consistent with the property rights theory However, this does not imply that it is inconsistent with the adjustment cost theory

The following is a simple version of the adjustment cost theory and is based solely on the direct adjustment cost that a firm incurs in bargaining and negotiation processes Other versions are based on indirect adjustment costs (i e , incentive effects) The exposition is based on Wernerfelt's (1997) work

To keep things simple, I assume that all adjustments are implemented perfectly such that governance mechanisms can be compared in terms of the direct adjustment costs of implementation In each period, a buyer may receive a service from a seller The service is costly to the seller, but it creates value for the buyer Part of this value can be transferred to the seller through a payment (w) There is a set of feasible services (A), and the ideal service is that which generates the most gross surplus (buyer value less seller costs gross of adjustment costs) Between any two periods, costs and values of all services change, such that the identity of the ideal service changes with probability (λ) Thus, this parameter measures the frequency of adjustment I assume that the buyer always knows the identity of the ideal and that the players always implement it Given these assumptions, I can compare how alternative game forms govern adjustments I focus on only three such forms

1 *Negotiation-as-needed* The players negotiate a new w whenever they switch to another service Most residential construction projects are governed in this way
2 *Price list* The players negotiate a set of prices *ex ante*, after which the buyer selects from the menu at each opportunity to switch This arrangement applies, for example, when buyers visit a beauty shop or a tax preparation service
3 *Employment relationship* The players first negotiate a constant w, and then they enter into an implicit contract in which the buyer dictates adjustments to the seller, and either player may terminate the relationship at any time A classical example of this is the relationship between a manager and his or her secretary

Negotiation-as-needed and the price list represent the market There are other market game forms as well, but it is clear that a complete list cannot be produced Conversely, the employment relationship (i e , the firm) is not an arbitrary choice There can be no game form that requires players to negotiate fewer prices and, consequently, no game form with lower variable costs per adjustment Thus, for sufficiently frequent adjustments, no other game form can perform better

The costs of negotiating a wage contract are C_f, the costs of negotiating a single price are C_b, and the costs of negotiating a price list of length ($|A_p|$) is $C(|A_p|)$ Thus, $|A|$ measures the diversity of adjustments If a firm implements all adjustments, the price list must cover all elements of A In an infinite horizon model, the average per-period net surpluses from the three game forms differ only in terms of the direct adjustment costs If ρ is the rate of interest, the direct per-period adjustment costs are λC_b for negotiation-as-needed, $\rho C(|A|)$ for the price list, and ρC_f for the employment relationship If the price list is partial, such that $|A_p|$ is smaller than $|A|$, it does not implement all adjustments and therefore performs worse Either way, the employment relationship is more efficient than negotiation-as-needed when the frequency of adjustment is high and is more efficient than a price list when the set of possible adjustments is diverse That is, if many adjustments are required, it is prohibitively expensive to negotiate all of them, and if the set of possible adjustments is large, it is too expensive to negotiate a complete price list (see Figure 1) Phrased as a theory of the vertical scope of the firm, the adjustment cost theory predicts that the firm should internalize supply relationships that require frequent and diverse adjustments

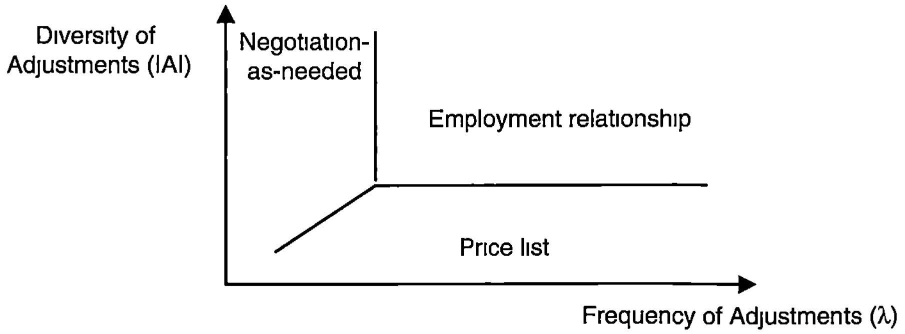
The RBV of the Firm

The RBV (Wernerfelt 1984) is based on the premise that firms differ, even within an industry The differences occur in the firms' resources, and the main theory is that a firm's strategy should depend on its resources—if a firm is good at something, the firm should try to use it

The simplest application of the RBV is at the level of business-unit strategy That is, given that the firm participates in a specific industry, how should it compete? In general, the answers are straightforward If a firm faces lower variable costs or can produce higher-quality products than those of its competitors, it can often increase profitability by positioning its products accordingly Similarly, firms with strengths in product development should probably introduce more new products than their differently endowed competitors

A deeper application pertains to the question of corporate strategy In which industries should the firm participate? Again, the main prescription is simple A firm should compete in industries in which its resources are important For example, this implies that firms that are good at product development are likely to populate industries in which product development is important If others were to enter, the firms would be at a significant competitive disadvantage and perhaps unable to survive

FIGURE 1
Efficient Game Forms



Because firms are rarely designed from scratch, industry selection is often accomplished through a process of diversified expansion. In this process, a firm seeks one or more new industries to enter without questioning its continuing participation in its current markets. Under such circumstances, a resource is available only if the firm has capacity in excess of what is needed in its current markets (Penrose 1959).

Resources differ greatly in the likelihood that they appear in excess capacity. To help identify resources that are most likely to be in excess capacity, I classify them according to their short- and long-term capacity (Wernerfelt 1989). Resources with fixed capacity, typically physical assets, rarely play a role in considerations to expand a firm's scope. They support expansion only to the extent that misfortunes, such as declining sales, have caused the firm to have more fixed-capacity resources than the original application can use. At the other end of the spectrum, a firm can potentially use resources with practically unlimited capacity (e.g., brand equity) in a large number of industries. With respect to this type of resource, I place a firm's reputation in this category.

The last category consists of resources with fixed short-term but unlimited long-term capacity. Corporate culture is a standard example of this resource category, but a firm's learning curve may be a more important case. Individual employees can transfer some learning to other firms, but the firm-specific nature of a significant part of the learning curve suggests that much of the effect resides at the team level (Lieberman 1984). Resources developed through a firm's learning provide most of the examples in Wernerfelt's (1984) study, and the current study also examines firms' ever-growing skills in product development as a resource in this category.

Hypotheses

In this section, I apply the theories to the managerial challenges previously discussed and formulate several hypotheses about vertical and horizontal scope. To help situate the concepts, consider Time Warner as a firm with large vertical scope and Procter & Gamble as a firm with broad horizontal scope.

Vertical Scope

If a firm has resources in new product development, it should leverage them by participating in an industry in which product development, and thus the resource, plays an important role. Given this, the firm must trade with the adjacent stages, even if it brings no special skills to those industries. As I have argued, product development processes typically require frequent adjustments in the supply chain. According to the adjustment cost theory, this implies that it may be too costly to engage in negotiations at every turn and cheaper to bring the supplier in-house. Thus, I hypothesize that, on average, firms that pursue more intensive product development benefit more from a larger vertical scope than a horizontal one.

H_1: A larger vertical scope is more efficient for firms with more product development resources.

Assuming that firms optimize, this implies the following:

H_2: Firms with more product development resources are more likely to have a large vertical scope.

Horizontal Scope

To apply the adjustment cost theory to the attempt to leverage product development resources, in some detail I consider exactly how the services of these resources enter the development process. I argue that firms typically deploy process-management skills and reputations, two resources that this article examines, in ways that involve frequent reactions to a diverse set of circumstances.

To make the argument for skills in the management of product development processes, I engage in a counterfactual thought experiment. Consider how a firm with expert skills in product development could charge money in exchange for helping another firm, the client, with its product development. The process could begin with advice about the collection of certain kinds of information and then use a particular organizational structure. However, this process is not likely to contain additional news for the client. Because this type of advice is unconditional, it can be codified and sold, so the client probably knows it already. The expert might add more value after the process begins, when the client must react to information as it is revealed At this point, codification is impossible, and judgment is required To transfer this, the expert firm would likely move groups of its own experienced people into "shadow positions" so that they could give ongoing advice to key members of the client's organization Other people in the firm could be consulted occasionally In the end, the client will have received several small services, mostly in the following form "In this situation, we will try such-and-such" In other words, such a service may require a lot of contracting According to the adjustment cost theory, this is likely to be prohibitively expensive, which suggests that the expertise be leveraged through a broader scope instead

For reputation resources, including brand names, it is less the use and more the value-relevant aspects of this use that change frequently and widely For example, all the uses of a brand affect its value, and though the brand's owner might approve of a single, specific use of it, even minor variations would need approval However, I do not mean to make an absolute statement Some brand names are licensed to other firms, but the majority of names are not In contrast, it is hardly possible for a firm to rent out its reputation to other retailers

In summary, attempts to leverage some of the most important resources involved in new product development—namely, process-management skills and reputations—typically involve frequent reactions to a diverse set of circumstances The adjustment cost theory suggests that a firm should leverage these resources through a broader horizontal scope

> H_3 A larger horizontal scope is more efficient for firms with more product development resources

Again, invoking the optimization assumption, this implies the following

> H_4 Firms with more product development resources are more likely to have a broader horizontal scope

The main focus of this article is the behavior hypotheses (H_2 and H_4), which predict that firms with more resources in new product development have a larger vertical and horizontal scope The performance hypotheses (H_1 and H_3) cannot be tested on real data under orthodox assumptions If firms are optimizing, there cannot be any observations of less-than-optimal performance, and thus the hypotheses are not testable A test is only possible if there are some mistakes among the observations Thus, there is some tension between the two sets of tests One relies on the assumption that, on average, firms do not make mistakes, and the other requires that at least some firms do Although it is possible that most, but not all, firms behave correctly, this does not avoid the problem entirely It is logical to treat scope decisions as endogenous in one test and exogenous in another However, it is not possible to appeal to a distinction between long- and short-term endogeneity by asserting that firm scope changes more slowly than does performance A more pragmatic argument is that the equations are likely to suffer from omitted variables Variance in the equations may allow for the estimation of the effects by driving a wedge between the truly optimal scope and the best guess based on a subset of the relevant variables

Empirical Test

Data

Theoretical arguments rooted in the RBV have far outstripped empirical tests, at least partially because it has been difficult to obtain objective measures of firms' resource stocks Some resources are difficult to identify, and even if they can be identified, many measures suffer from endogeneity problems, whereas others require hard-to-get qualitative information Another problem is that many resources exist at the business-unit level (Rumelt 1991), whereas most data are typically available at the more aggregate firm level (Montgomery [1994] reports that the average *Fortune* 500 firm operates in 11 industries) In an attempt to overcome these problems, I have tested the predictions on the well-known PIMS database, which offers both qualitative and quantitative information at the business-unit level This database, which Buzzell and Gale (1987) describe, is unique because it contains both financial information and several qualitative items Researchers have used the database in more than 100 academic papers In the 1970s and the 1980s, researchers used the database to study all the important questions of the period, such as the value of market share, the profitability of early entry, and the importance of product quality Currently, the research community uses PIMS more selectively, often in the context of more theory-driven work (e g , Boulding and Christen 2003) The database is still being updated, and the PIMS Europe consulting company in London maintains it

Compared with what would be available in a customized data-collection effort, the size of PIMS is a major advantage A more important advantage is that the unit of observation is a business unit rather than a firm Because most large firms are diversified, firm-level data are essentially averaged By avoiding this, PIMS provides a much more precise picture of individual relationships (even if the data are subject to some measurement error from allocation rules) A disadvantage of using this database is that researchers cannot ask new questions with "new" variables but are limited to a fixed set of preexisting items Furthermore, because the data are disguised, industry or firm effects cannot be controlled

Testing Strategy

I test the behavior hypotheses (H_2 and H_4) by examining measures of scope as functions of a set of exogenous indicators of resources in product development The logic is standard, and the tests are conceptually straightforward In particular, I base the tests of the behavior hypothesis on linear regressions of the following form

$$S = \delta_0 + \delta_1 R, \tag{1}$$

where S is the vertical or horizontal scope, and R is a set of indicators of resources in new product development I operationalize H_2 and H_4 as follows

$$H_2, H_4 \quad \delta_1 > 0$$

It is more difficult to test the performance hypotheses, and though the analysis is informative, the interpretation relies on some slightly uncomfortable assumptions I propose to test H_1 and H_3 by estimating strategic-business-unit-level production functions and by examining productivity effects of scope as functions of exogenous indicators of resources in new product development By using interaction variables, I can isolate circumstances in which changes in scope help and hurt labor productivity As discussed previously, I estimate the production functions with the implicit assumption that horizontal and vertical scope are exogenous (because of omitted variables and mistakes) or at least fixed in the short run Although this seems defensible, the same assumptions must be made about labor and capital, and in the case of labor, it is less compelling To mitigate these problems, I estimate the log of performance on a per-employee basis I postulate a constant returns-to-scale production function in which value added (V) depends on labor (L), capital (K), scope (S), and indicators of resources in new product development (R) (Because scaling disguises the data, there are not flexible returns to scale Exploratory analysis implies that the true model has moderate returns to scale, perhaps to a power of 1 1)

Specifically, I estimate the following

$$V = \alpha(S,R)K^{\beta}L^{1-\beta}, \tag{2}$$

in the form

$$\text{Log}(V/L) = \gamma_0 + \gamma_1 S + \gamma_2 R + \gamma_3 SR + \beta\text{Log}(K/L) \tag{3}$$

If the functional form of Equation 2 is taken seriously, $\alpha(S,R) = \exp(\gamma_0 + \gamma_1 S + \gamma_2 R + \gamma_3 SR)$ To test the hypothesis that integration is the more efficient way to leverage resources in new product development, I hypothesize that the cross-derivative is positive That is, for either type of S and R, I operationalize H_1 and H_3 as follows

$$H_{1a}, H_{3a}\ \gamma_3 + (\gamma_1 + \gamma_3 ER)(\gamma_2 + \gamma_3 ES) > 0,$$

where E is the expectation operator If there is uncertainty about the functional form of the production function, a weaker hypothesis is as follows

$$H_{1b}, H_{3b}\ \gamma_3 > 0$$

Measures

To test the hypotheses, indicators of the presence of resources in new product development are needed However, this is not a straightforward task The most natural resource indicators are firm-level decisions that are subject to endogeneity problems A correlation between a decision and scope could be interpreted as evidence that both are caused by the presence of product development resources However, the extent to which the scope of the firm influences the decisions cannot be removed For example, it would not be possible to interpret a single regression with product quality, firm advertising, or firm research and development A firm may have a broad scope and advertise frequently because it has product development resources, or it may advertise because it has broad scope Trying to steer clear of endogeneity problems to the extent that is possible, I found indicators that are reasonably exogenous Two of them are at the industry level, and one is an outcome measure

The industry measures capture the time that is typically needed to develop a new product and the extent to which it is difficult to predict when new products will be launched The use of industry measures relies on the premise that firms elect to compete in industries with certain challenges only if they have the resources to cope with them For example, in an industry in which the average participant develops new products quickly, all participants are likely to be fairly good at fast-paced product development In an industry with several participants, this is a fairly exogenous proxy for the resources of any individual firm

The outcome measure is the percentage of firm sales accounted for by new products Because price and other marketing variables indirectly control the outcome measure, it is less exogenous than the industry measures However, it is better than advertising or quality, which are completely endogenous With more direct indicators, different hypotheses about horizontal and vertical scope might be possible However, because this does not seem possible, I use the same explanatory variables to predict both aspects of firm scope I use the most recent observation for each firm of the variables subsequently discussed This means that some data points are relatively new, whereas others may be as many as 25 years old

Development time for new products (DT) DT is measured by management responses to the following question "For this firm and its major competitors, what is the typical time lag between the beginning of a development effort for a new product and its market introduction?" The possible answers are "less than one year," "one to two years," "two to five years, "more than five years," and "little or no product development occurs in this firm" These are coded as 1, 2, 3, 4, and 5, respectively

Random product changes (PC) PC are measured by management responses to the following question "Is it typical practice for this firm and its major competitors to change all or part of the line of products or services offered annually? "Seasonally?" "Periodically, but at intervals longer than one year?" Or is there "no regular, periodic pattern of change?" Because this question confounds frequency and randomness, I used only observations with the last two responses and coded them as 0 and 1, respectively (Approximately 5% of the data are lost by this procedure) Thus, this is a coarsely measured variable

Percentage of sales from new products (NP) NP refers to the products that firms have introduced in the past three years and is measured at the firm, rather than the industry, level

Horizontal scope (HS) HS is measured by management responses to a question about the "extent to which your business unit shares facilities" with other units in the firm The idea is not that firms have a broader horizontal scope to share assets but that firms with a broader scope have more options to share assets, such that the actual scope is positively correlated with this measure Because answers are reported on a three-point scale ("less than 10%," "between 10% and 80%," and "more than 80%"), this measure is also coarse Another concern is the underreporting of the horizontal scope, because many firms may have divisions that

TABLE 1
Means and Correlations

	Mean (S.D.)	VS	DT	PC	NP	VA/L	K/L
HS	1 70 (77)	038*	– 053*	014	051*	252*	120*
VS	54 8 (16 8)		– 049*	061*	063*	– 006*	– 217*
DT	2 98 (1 30)			156*	– 262*	– 041*	086*
PC	3 74 (59)				– 184*	050*	024
NP	8 15 (14 9)					014	– 043*
VA/L	57 7 (50 4)						718*
K/L	50 5 (66 0)						

*$p <$ 01
Notes N ranges from 3469 to 3526 S D = standard deviation

do not share the plant and equipment with any other division of the firm However, it is difficult to tell a natural story in which this creates a bias in favor of the hypotheses Suppose that the theory is wrong and that firms expand their scope for other reasons In this case, it would be more difficult to share assets in fast-paced industries, which would result in a negative relationship between the measured incidence of diversification and the extent to which the business operates in a fast-paced industry The same argument may defend against misinterpretations of the performance model

Vertical scope (VS) VS is measured by the value added (sales less material costs) as a percentage of sales at the business-unit level This measure has a long history in the literature that begins with Gort's (1962) work I have omitted approximately 20% of the business units because they report internal sales or purchases This is unfortunate because the average firm, thus omitted, would be expected to have larger vertical scope than those included However, the internal flows cannot be tracked, and thus corporate scope cannot be measured For the observations I use, VS is equal to both firm- and corporate-level scope for the product line in question The good news is that there is still plenty of variance on the measure

Labor productivity (VA/L) VA/L is measured in constant dollars as value added per employee

Capital per employee (K/L) K/L is measured in constant dollars as total assets per employee

Results

The descriptive statistics appear in Table 1 Because the sample size is so large, it is not surprising that most of the correlations are significant The most notable result in Table 1 may be the nonsignificant correlation between VS (= VA over sales) and VA/L In a model with constant returns to scale, there is no theoretical reason to believe that the two are correlated, all three variables should go up in concert However, any measurement noise in VA would induce a false positive result The absence of this boosts confidence in the data

The correlations in Table 1 show the pattern that the theory predicts at the univariate level Both HS and VS are negatively correlated with DT and positively correlated with the extent of PC as well as the importance of NP Five of these six correlations are significant at the 1% level

The estimates of the behavior regressions appear in Table 2 Whereas the absence of control variables causes the regressions to have low adjusted-R^2 values, the results of interest are strong All the signs conform to the predictions, and five of the six coefficients are significant Although the pattern of significance is different, the results are remarkably consistent with the hypotheses Firms choose to have a larger scope when DT is short, when PC is important, and when NP is important

Estimates of the two production functions appear in Table 3 The six test statistics of the form $\gamma_3 + (\gamma_1 + \gamma_3 ER)(\gamma_2 + \gamma_3 ES)$ all have the predicted sign, and four of the six interaction variables (γ_3) are significant Both vertical and horizontal integration helps productivity when DT is short, when PC is important, and when NP is important Although there are many reasons for insignificance, the results are also consistent with the claim that, on average, scope neither helps nor hurts productivity (The net coefficients on VS and HS are 0073 and 0848, respectively, and both have t-values below 1)

Discussion

I have used the adjustment cost theory and the RBV of the firm to make and test the claim that many product development resources make it more attractive for the firm to have a broader scope I test this prediction on both vertical and horizontal scope in terms of both actual firm behavior and production functions Although the measures are coarse, there are several of them The results are strongly and robustly consistent with the theory

TABLE 2
Extent of Vertical and Horizontal Scope

Independent Variable	Vertical Scope	Horizontal Scope
DT	– 5530** (–2 42)	– 0291** (–2 68)
PC	2 3487** (4 74)	0104 (28)
NP	0742** (3 71)	0022* (2 32)
N	3413	3245
Adjusted R^2	0106**	0042**

*$p <$ 05
**$p <$ 01
Notes t-statistics are in parenthesis

TABLE 3
Estimates of Log Labor Productivity

Independent Variable	Productivity of Vertical Scope	Productivity of Horizontal Scope
Log K/L	6004 (79 23)	5621 (72 13)
VS	0100** (2 75)	
HS		1438 (1 06)
DT	0262 (1 54)	0279 (2 06)
PC	0241 (59)	– 0750 (–1 57)
NP	– 0030 (–1 70)	0006 (52)
VS × DT (Hyp < 0)	– 0013** (–4 30)	
HS × DT (Hyp < 0)		– 0419** (–5 76)
VS × PC (Hyp > 0)	0006 (75)	
HS × PC (Hyp > 0)		0835** (3 28)
VS × NP (Hyp > 0)	0001* (2 32)	
HS × NP (Hyp > 0)		0005 (85)
N	3412	3244
Adjusted R^2	6578**	6440**

*$p <$ 05
**$p <$ 01
Notes t-statistics are in parentheses

The limitations of the data, which result in a lack of control variables, open the door for alternative explanations However, most alternative theories do not speak to the variables that I used, and because the same three variables predict increased scope in four different cases, the bar has been raised for alternative explanations

Another problem, which I discussed previously, is that not all product development resources justify expansions in the scope of the firm Because the measures do not allow for distinction between different types of resources, I rely on a maintained hypothesis about the relative importance of different types of resources for the average firm in the sample This means that there are many counterexamples to the averages that the empirical work has measured However, it is more difficult to find counterexamples to the theoretical claims

I do not wish to suggest that vertical and horizontal scope go hand in hand in general The extent to which a firm has resources in product development may be one of the only variables that correlates positively with both types of scope In both cases, it increases the need for frequent and diverse adjustments, but the mechanisms that underlie the two correlations are quite different Resources in product development correlate with vertical scope because they cause demands for adjustments on other levels of the supply chain They correlate with horizontal scope because their application generates demands for adjustments

As should be clear from the theoretical part of the article, the empirical research can be refined in several directions In particular, better measures might allow for the distinction between different classes of product development resources and environments with stronger or weaker demands for adjustments It would also be interesting to examine other resources

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Ahmet H. Kirca, Satish Jayachandran, & William O. Bearden

Market Orientation: A Meta-Analytic Review and Assessment of Its Antecedents and Impact on Performance

The authors conduct a meta-analysis that aggregates empirical findings from the market orientation literature First, the study provides a quantitative summary of the bivariate findings regarding the antecedents and the consequences of market orientation Second, the authors use multivariate analyses of aggregate study effects to identify significant antecedents of market orientation and the process variables that mediate the relationship between market orientation and performance In addition, using regression analysis, the authors find that the market orientation–performance relationship is stronger in samples of manufacturing firms, in low power-distance and uncertainty-avoidance cultures, and in studies that use subjective measures of performance The authors also find that the market orientation–performance correlation is stronger for both cost-based and revenue-based performance measures in manufacturing firms than in service firms On the basis of the findings, the authors conclude with a discussion of the implications for practice and further research

The marketing concept, a cornerstone of modern marketing thought, stipulates that to achieve sustained success, firms should identify and satisfy customer needs more effectively than their competitors (Day 1994, Kotler 2002) Much of the prolific market orientation literature examines the extent to which firms behave, or are inclined to behave, in accordance with the marketing concept (Kohli and Jaworski 1990) Market orientation has been conceptualized from both behavioral and cultural perspectives (Homburg and Pflesser 2000) The behavioral perspective concentrates on organizational activities that are related to the generation and dissemination of and responsiveness to market intelligence (e g , Kohli and Jaworski 1990) The cultural perspective focuses on organizational norms and values that encourage behaviors that are consistent with market orientation (Deshpandé, Farley, and Webster 1993, Narver and Slater 1990) Throughout the past two decades, researchers have investigated several antecedents and consequences of market orientation to better understand its role in organizations, and as we outline next, a thorough quantitative, meta-analytic review of this research stream should benefit both practice and research

First, the current state of research in market orientation can be evaluated with a meta-analysis by estimating the mean values and range of effects for its relationships with various antecedents and consequences (see Farley, Lehmann, and Sawyer 1995) Second, individual studies typically examine subsets of the antecedents and consequences of market orientation Meta-analytic evidence obtained by aggregating empirical findings across studies can be used to assess more comprehensive models of factors that drive the implementation of market orientation and mediate its impact on performance (e g , Brown and Peterson 1993) Third, prior studies in the market orientation literature exhibit variation in their findings regarding the magnitude and direction of the relationship between market orientation and organizational performance Although the predominant view is that market orientation is positively associated with performance (Jaworski and Kohli 1993, Slater and Narver 1994a), several researchers have reported nonsignificant or negative effects for this association (e g , Agarwal, Erramilli, and Dev 2003, Bhuian 1997, Sandvik and Sandvik 2003) In addition, research has obtained disparate findings on the effects of moderators of the relationship between market orientation and performance (e g , Grewal and Tansuhaj 2001, Slater and Narver 1994a) A meta-analysis can provide insights into these inconsistencies by identifying measurement and sample characteristics that affect the market orientation–performance relationship and can assess the generalizability of the relationship (Brown and Peterson 1993)

Previous attempts to consolidate research findings in the market orientation literature have been qualitative (e g , Jaworski and Kohli 1996, Lafferty and Hult 2000), designed to examine only the market orientation scale (see Deshpandé and Farley 1999), or narrowly focused and based on small samples (see Cano, Carrillat, and Jaramillo 2004) Therefore, to accomplish the objectives mentioned

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Ahmet H Kirca is Assistant Professor of International Business, School of Business, George Washington University (e-mail kirca@gwu edu) Satish Jayachandran is Assistant Professor of Marketing (e-mail satish@moore sc edu), and William O Bearden is Bank of America Chaired Professor of Marketing (e-mail bbearden@moore sc edu), Moore School of Business, University of South Carolina The authors thank Rajdeep Grewal, Subhash Sharma, Terry Shimp, and Stan Slater for their comments on previous versions of this article

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previously, we conduct a meta-analysis of the market orientation literature. First, we present a theoretical framework to guide the meta-analysis. Second, we discuss the development of the database for the meta-analysis. Third, we use the meta-analysis to provide a quantitative summary that documents the mean values and range of effects for the relationships that involve market orientation. Fourth, we use multivariate analyses to reveal the critical antecedents of market orientation. Fifth, we focus on the market orientation–performance relationship and conduct a detailed examination that includes (1) a multivariate analysis to illustrate the paths through which market orientation influences performance, (2) regression analyses to provide insights into sample and measurement characteristics that moderate the market orientation–performance relationship, and (3) a nonparametric assessment of substantive moderators of the market orientation–performance relationship. We conclude with a discussion of managerial and future research implications.

Theoretical Framework

We developed the conceptual framework shown in Figure 1 on the basis of the extant market orientation and meta-analysis research (Jaworski and Kohli 1993, 1996; Narver and Slater 1990; Szymanski, Bharadwaj, and Varadarajan 1993). The framework depicts the relationships among the most frequently examined antecedents and consequences of market orientation, as well as the relationships involving the effects of measurement and sample characteristics and the substantive moderators on the market orientation–performance relationship. Justification for the associations between market orientation and its antecedents and consequences is based on prior marketing literature, and therefore we only briefly discuss them herein. Theoretical rationale for the moderating effects of measurement and sample characteristics and the substantive moderators on the market orientation–performance relationship appears in the subsequent sections in which we examine the effects.

Antecedents of Market Orientation

Consistent with Jaworski and Kohli's (1993) work, we classify the antecedents of market orientation into three broad categories: top management factors, interdepartmental factors, and organizational systems. Top managers shape the values and orientation of an organization (Webster 1988). As such, top management emphasis on market orientation has a positive impact on the level of an organization's market orientation (Day 1994; Narver and Slater 1990). Interdepartmental factors include interdepartmental connectedness and conflict. Interdepartmental connectedness, or the extent of formal and informal contacts among employees across various departments, enhances market orientation by leading to greater sharing and use of information (Kennedy, Goolsby, and Arnould 2003). Interdepartmental conflict, or the tension between departments that arises from divergent goals, inhibits concerted responses to market needs and thus diminishes market orientation (Jaworski and Kohli 1993).

The third set of antecedents, organizational systems, consists of two structural variables, formalization and centralization, and two employee-related systems, market-based reward systems and market-oriented training. Formalization, which refers to the definition of roles, procedures, and authority through rules, is inversely related to market orientation because it inhibits a firms' information utilization and thus the development of effective responses to changes in the marketplace (Jaworski and Kohli 1993). Centralization, which refers to a limited delegation of decision-making authority in an organization, negatively affects market orientation, because it inhibits a firm's information dissemination and utilization (Matsuno, Mentzer, and Ozsomer 2002). Market-based reward systems use market-oriented behaviors as metrics to reward employees, thus motivating employee actions that enhance market orientation. Market-oriented training augments employees' sensitivity to customer needs, thus stimulating actions that are consistent with the requirements of market orientation (Ruekert 1992).

Consequences of Market Orientation

The consequences of market orientation are organized into four categories: organizational performance, customer consequences, innovation consequences, and employee consequences (see Jaworski and Kohli 1996). The marketing strategy literature posits that market orientation provides a firm with market-sensing and customer-linking capabilities that lead to superior organizational performance (Day 1994; Hult and Ketchen 2001). Organizational performance consists of cost-based performance measures, which reflect performance after accounting for the costs of implementing a strategy (e.g., profit measures), and revenue-based performance measures, which do not account for the cost of implementing a strategy (e.g., sales and market share).[1] In addition, researchers have also used global measures that assess managers' perceptions of overall business performance, mostly through comparisons of organizational performance with company objectives and/or competitors' performance (e.g., Jaworski and Kohli 1993).

Customer consequences include the perceived quality of products or services that a firm provides, customer loyalty, and customer satisfaction with the organization's products and services (Jaworski and Kohli 1993, 1996). Market orientation proposes to enhance customer-perceived quality of the organization's products and services by helping create and maintain superior customer value (Brady and Cronin 2001). Market orientation enhances customer satisfaction and loyalty because market-oriented firms are well positioned to anticipate customer needs and to offer goods and services to satisfy those needs (Slater and Narver 1994b).

Innovation consequences include firms' innovativeness, their ability to create and implement new ideas, products, and processes (Hult and Ketchen 2001), and new product performance (i.e., the success of new products in terms of market share, sales, return on investment, and profitability) (Im and Workman 2004). Market orientation should enhance an organization's innovativeness and new product performance because it drives a continuous and proactive disposition toward meeting customer needs and it empha-

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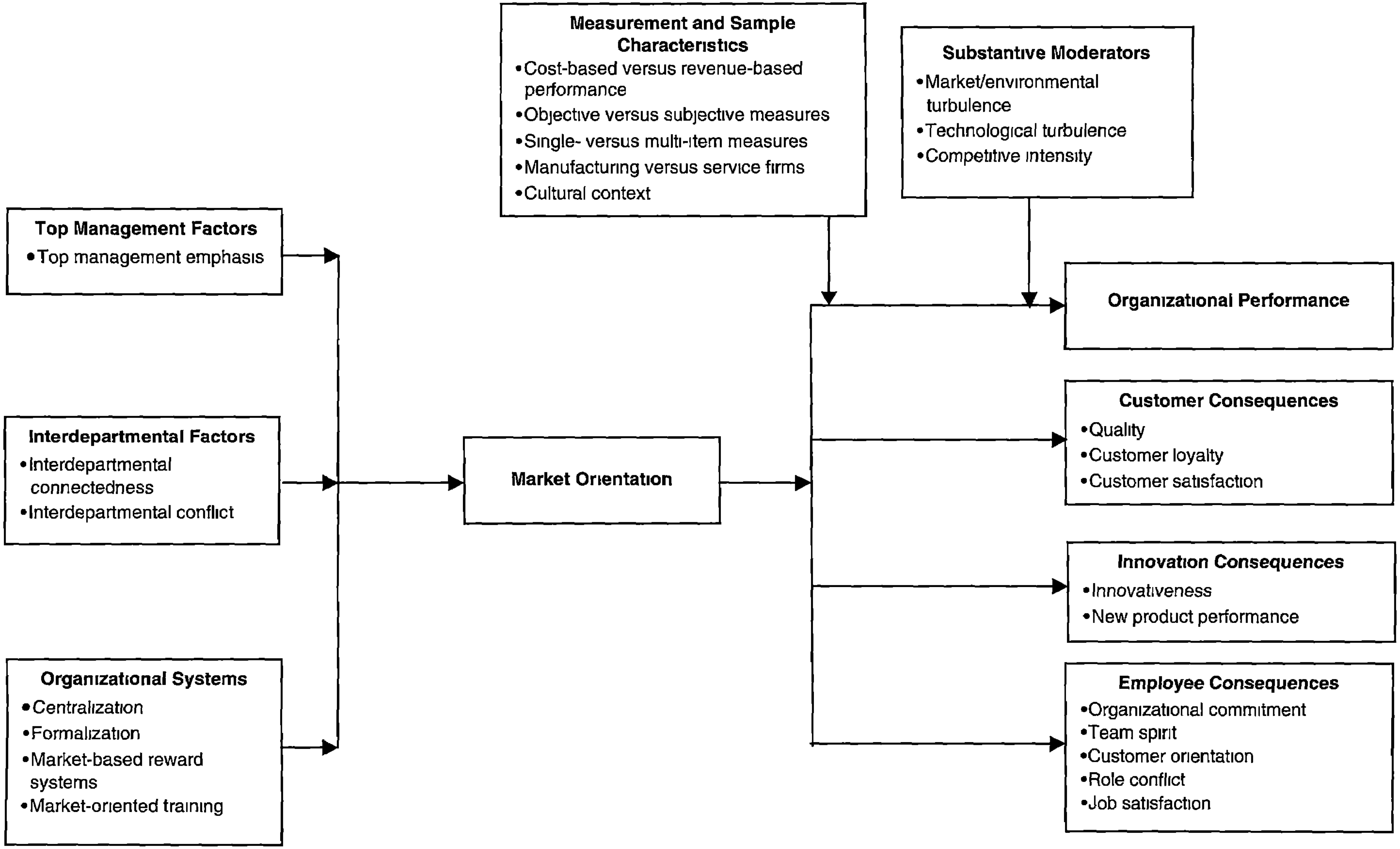
[1] We thank an anonymous reviewer for this suggestion.

FIGURE 1
Conceptual Framework for Meta-Analysis


Measurement and Sample Characteristics
•Cost-based versus revenue-based performance
•Objective versus subjective measures
•Single- versus multi-item measures
•Manufacturing versus service firms
•Cultural context
Substantive Moderators
•Market/environmental turbulence
•Technological turbulence
•Competitive intensity
Top Management Factors
•Top management emphasis
Interdepartmental Factors
•Interdepartmental connectedness
•Interdepartmental conflict
Organizational Systems
•Centralization
•Formalization
•Market-based reward systems
•Market-oriented training
Market Orientation
Organizational Performance
Customer Consequences
•Quality
•Customer loyalty
•Customer satisfaction
Innovation Consequences
•Innovativeness
•New product performance
Employee Consequences
•Organizational commitment
•Team spirit
•Customer orientation
•Role conflict
•Job satisfaction

sizes greater information use (Atuahene-Gima 1996, Han, Kim, and Srivastava 1998) For employee consequences, Kohli and Jaworski (1990) argue that by instilling a sense of pride and camaraderie among employees, market orientation enhances organizational commitment (i e , willingness to sacrifice for the organization), employee team spirit, customer orientation (i e , the motivation of employees to satisfy customer needs), and job satisfaction In addition, market orientation can reduce role conflict, which Siguaw, Brown, and Widing (1994) define as the incompatibility of communicated expectations that hamper employees' role performance

Database Development

To ensure the representativeness and completeness of the database we used in the meta-analysis, we searched the ABI/INFORM, Science Direct, and Wilson Business Abstracts for studies published before June 2004, using the keywords "market orientation," "customer orientation," and "consumer orientation" We also searched the Social Sciences Citation Index for studies that referred to the three most highly cited articles in the market orientation literature (i e , Jaworski and Kohli 1993, Kohli and Jaworski 1990, Narver and Slater 1990) We examined the references from the market orientation articles identified in these two steps for additional studies We posted requests on a series of listservs to obtain unpublished research in an effort to address the "file-drawer" problem (Rosenthal 1995)

We selected studies for inclusion in the meta-analysis on the basis of two criteria First, the meta-analysis included only the studies that reported the r-family of effects (i e , correlation coefficients or its variants, Rosenthal 1994) Second, we included only the articles that measured market orientation at the organizational level so that results from research that had vastly divergent goals were not aggregated (Franke 2001, Hunter and Schmidt 1990) On completion of the search process in June 2004, we had obtained a total of 418 effects from 130 independent samples reported in 114 studies[2]

We followed procedures employed in other meta-analyses in marketing for the development of the final database (e g , Brown and Peterson 1993, Henard and Szymanski 2001) We first prepared a coding form that specified the information that was to be extracted from each study to reduce coding error (Lipsey and Wilson 2001, Stock 1994)[3] We then corrected effects obtained from each study for measurement error by dividing the correlation coefficient by the product of the square root of the reliabilities of the two constructs (Hunter and Schmidt 1990) When a study did not report the reliability or used a single-item measure for a relevant construct, we used the mean reliability for that construct across all studies for the reliability correction (see Geyskens, Steenkamp, and Kumar 1998) We transformed the reliability-corrected correlations into Fisher's z-coefficients Subsequently, we averaged the z-coefficients, weighted them by an estimate of the inverse of their variance (N – 3) to give greater weight to more precise estimates, and then reconverted them to correlation coefficients (Hedges and Olkin 1985)

Antecedents and Consequences: Quantitative Summary of Bivariate Relationships

Table 1 summarizes the bivariate correlations and other statistics for the relationships between market orientation and its antecedents and consequences (see Figure 1) In total, we collected 63 and 355 effect sizes for the antecedents and consequences of market orientation, respectively Consistent with traditional hypotheses, we obtained significant, positive reliability-corrected mean correlations for the relationships between market orientation and top management emphasis (r = 44, $p < 05$), interdepartmental connectedness (r = 56, $p < 05$), market-based reward systems (r = 41, $p < 05$), and market-oriented training (r = 54, $p < 05$) The evidence also shows significant, negative associations between market orientation and interdepartmental conflict (r = – 28, $p < 05$), centralization (r = – 27, $p < 05$), and formalization (r = – 12, $p < 05$)

Among the consequences, the market orientation–performance relationship has been the most frequently examined association Substantially less attention has been paid to the association between market orientation and customer consequences (only 10% of all effects) Notably, the meta-analysis reveals a positive association between market orientation and performance (r = 32, $p < 05$) that can be categorized as "above medium" (Cohen 1988) and is consistent with Cano, Carrillat, and Jaramillo's (2004) findings Furthermore, market orientation positively affects various measures of performance, such as overall business performance (r = 46, $p < 05$), profits (r = 27, $p < 05$), sales (r = 26, $p < 05$), and market share (r = 31, $p < 05$)

The evidence summarized in Table 1 also reveals that market orientation is positively associated with various customer consequences, such as perceived quality (r = 36, $p <$

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[2] A complete bibliography of the studies included in the meta-analysis is available from the authors Several studies could not be included because (1) their results were reported only in multivariate models (e g , Greenley 1995, 46 studies), (2) their results were based on data used in other studies that were already included (16 studies), and (3) they reported relationships that were unique and could not be integrated with those in other studies (e g , Fahy et al 2000, 10 studies) The inclusion rate of 61% is comparable to other meta-analyses in marketing by Brown and Peterson (1993, 66%), Szymanski, Bharadwaj, and Varadarajan (1993, 63%), and Szymanski and Henard (2001, 59%)

[3] We revised an initial draft of the coding form on the basis of feedback from three marketing academics who were familiar with the market orientation and meta-analysis literature streams The final coding form included antecedents and consequences of market orientation, sample and measurement characteristics, and the r-family of effect size indicators, such as correlation coefficients and indicators that could be converted to correlation coefficients (e g , Student's t, chi-square, F-ratios with one degree of freedom, and p-values for group comparisons, see Rosenthal 1994) We checked coding quality by having an independent investigator code a random sample of 35% of the studies Following the procedures that Perreault and Leigh (1989) recommend, we calculated an interjudge reliability index for each of the measurement and sample characteristics The reliability estimate ranged between 91 and 1 0, suggesting that the reliability of the coding process was high (see Perreault and Leigh 1989, p 147)

TABLE 1
Overview of Antecedents and Consequences of Market Orientation

Construct (Traditional Hypothesis)	Number of Effects[a]	Total Sample Size	Corrected Mean[b] r	Standard Error	Range of r	Availability Bias[c]
Antecedents of Market Orientation	63	14,510				
Top Management Factors						
Top management emphasis (+)	13	4074	44*	02	– 13– 57	178
Interdepartmental Dynamics						
Interdepartmental connectedness (+)	20	3282	56*	02	10– 67	353
Interdepartmental conflict (–)	4	530	– 28*	04	– 59– 09	10
Organizational Systems						
Centralization (–)	9	2062	– 27*	02	– 43– 07	51
Formalization (–)	9	2185	– 12*	02	– 36– 30	17
Market-based reward systems (+)	5	1297	41*	03	20– 54	36
Market-oriented training (+)	3	1080	54*	03	43– 57	29
Consequences of Market Orientation	355	61,561				
Organizational Performance	214	36,150	32*	01	– 15– 79	6535
Overall business performance (+)	69	12,732	46*	01	– 08– 79	3125
Profit (+)	69	11,104	27*	01	– 13– 46	1812
Sales (+)	58	8735	26*	01	– 15– 59	681
Market share (+)	18	3579	31*	02	00– 50	167
Customer Consequences	43	6530				
Quality (+)	16	2361	36*	02	– 07– 71	127
Customer loyalty (+)	16	2485	35*	02	14– 58	170
Customer satisfaction (+)	11	1684	45*	02	01– 69	114
Innovation Consequences	60	11,935				
Innovativeness (+)	30	6013	45*	01	– 09– 60	646
New product performance (+)	30	5922	36*	02	07– 58	329
Employee Consequences	38	6946				
Organizational commitment (+)	12	2203	71*	03	24– 82	200
Team spirit (+)	8	1254	51*	03	00– 92	74
Customer orientation (+)	7	1214	25*	03	11– 56	28
Role conflict (–)	6	1338	– 54*	03	– 05– – 53	58
Job satisfaction (+)	5	937	61*	03	26– 64	47

*$p < 05$

[a] Contains relationships for which at least three effects were available

[b] The corrected mean correlation coefficients (r) are the sample-size-weighted, reliability-corrected estimates of the population correlation coefficients

[c] Availability bias refers to the number of unpublished studies reporting the null results needed to reduce the cumulative effect across studies to the point of nonsignificance (Lipsey 2001)

05), customer loyalty (r = 35, $p < 05$), and customer satisfaction (r = 45, $p < 05$) For the relationship between market orientation and innovation consequences, the bivariate results indicate that market orientation has positive associations with both an organization's innovativeness (r = 45, $p < 05$) and new product performance (r = 36, $p < 05$) Finally, the results we obtained with respect to employee consequences reveal that market orientation is correlated with organizational commitment (r = 71, $p < 05$), team spirit (r = 51, $p < 05$), customer orientation (r = 25, $p < 05$), employee role conflict (r = – 54, $p < 05$), and job satisfaction (r = 61, $p < 05$)

Overall, the findings are consistent with the predominant expectations in prior research The consequences of market orientation, particularly its impact on organizational performance, have received more research attention than its antecedents The high numbers for availability bias reported in Table 1 indicate that new or unpublished studies not included in the meta-analysis do not represent serious threats to the validity of the findings for the bivariate relationships we discussed previously (Lipsey and Wilson 2001) On the basis of the aggregate data, we now focus on assessing the relative impact of the antecedents of market orientation

Antecedents of Market Orientation: Multivariate Assessment

Aggregated study effects obtained from a meta-analysis can be used to assess simultaneously the effects of variables that prior research may not have considered jointly (Geyskens, Steenkamp, and Kumar 1999) For a construct to be included in such analyses, there must be multiple study effects that relate it to every other construct in the model (Brown and Peterson 1993) This constraint limited us to examining the following antecedents of market orientation interdepartmental connectedness, top management emphasis, centralization, formalization, market-based reward systems, and interdepartmental conflict The correlation matrix we used for the multivariate path analysis of market orientation and its antecedents appears in Table 2

We provided the theoretical rationale for these relationships previously as part of our description of the conceptual model depicted in Figure 1 As we summarize in Table 3, fit indices suggest adequate model fit (χ^2 = 76, degree of freedom [d f] = 1, *p* = 38, root mean square error of approximation [RMSEA] < 001, adjusted goodness-of-fit index [AGFI] = 96, normed fit index [NFI] = .99, and root mean square residual [RMSR] = 02) The multivariate findings indicate that though interdepartmental connectedness (β = 36, *p* < 05) has the strongest impact on market orientation, top management emphasis (β = 25, *p* < 05) and market-based reward systems (β = 24, *p* < 05) are also important antecedents of market orientation

Notably, the path coefficients for centralization and formalization are not significant in the multivariate analysis, though the bivariate results indicate that they significantly correlate with market orientation The nonsignificant finding regarding formalization is consistent with Kohli and Jaworski's (1993) previous discussion, which posits that the nature of formalized rules may well be more important for market orientation than the extent of formalization because rules can also be designed to enhance market orientation The nonsignificant result pertaining to centralization in the multivariate analysis could be due to the possibility that interdepartmental connectedness and reward systems counter the tendency of centralization to diminish market orientation by ensuring contact among employees and fostering information flow We discuss the implications of the latter finding for research and practice subsequently

As we noted previously, the market orientation–performance relationship is the most frequently examined association in the market orientation literature (i e , 51% of all effects) Therefore, and also because of the managerial importance of the market orientation–performance relationship, in the next three sections, we focus on examining (1) the mediators of the market orientation–performance relationship, (2) the variance in the market orientation–performance relationship that is associated with measurement and sample characteristics, and (3) the substantive

TABLE 2
Antecedents: Intercorrelations Among Constructs

	1	2	3	4	5	6	7
1 Market orientation	83						
2 Interdepartmental connectedness	46	82					
3 Top management emphasis	36	32	76				
4 Centralization	– 23	– 27	– 17	88			
5 Formalization	– 10	01	– 02	30	82		
6 Market-based reward systems	30	22	13	– 07	– 15	65	
7 Interdepartmental conflict	– 20	– 14	– 04	30	19	– 06	78

Notes Off-diagonal entries represent the average sample-size-weighted correlation (r) values Entries on the diagonal reflect sample-size-weighted mean reliabilities (Cronbach's α)

TABLE 3
Model Estimation Results: Antecedents of Market Orientation

	Hypothesized Model	
	Path Coefficient	t-Value
Interdepartmental connectedness–market orientation	36	3 27*
Top management emphasis–market orientation	25	2 55*
Centralization–market orientation	– 02	– 24
Formalization–market orientation	– 02	– 25
Market-based reward systems–market orientation	24	2 21*
Interdepartmental conflict–market orientation	– 14	–1 50
	χ^2(d f) = 76(1)	
	RMSEA = 00	
	AGFI = 96	
	NFI = 99	
	RMSR = 02	

*p < 05

Notes Error variances for each construct indicator were fixed at (1 – α), where α is the sample-size-weighted average reliability across studies (see Geyskens, Steenkamp, and Kumar 1998), and the median sample size across studies (n = 147) was used for estimation purposes (see Henard and Szymanski 2001)

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moderators of the market orientation–performance relationship

Mediators of the Market Orientation–Performance Relationship: Multivariate Assessment

Explicating the mediators of the market orientation–performance relationship has emerged as a topic of interest in the marketing literature Although a few studies have directly focused on the routes through which market orientation affects performance (see Han, Kim, and Srivastava 1998, Noble, Sinha, and Kumar 2002), a more thorough examination of mediating effects is possible with the aggregate data Toward this objective, we employ customer- and innovation-related mechanisms as process variables that mediate the market orientation–performance relationship (Han, Kim, and Srivastava 1998, Hurley and Hult 1998) As we show in Table 4 and Figure 2, Panel A, we could test a correlation matrix that includes four mediating factors (i e , customer loyalty, customer satisfaction, quality, and innovativeness) with the available data We could not include new product performance and employee consequences in the path analyses because of the absence of study effects relating them to every other construct in the model

We previously provided justification for the positive relationship between market orientation and the mediating constructs Therefore, to elucidate the process effects, we now focus on the influence of the mediating variables on performance Customer loyalty and satisfaction should have positive associations with organizational performance because they increase repeat purchase behavior and are associated with lower levels of customer complaints and negative word of mouth (Szymanski and Henard 2001) Quality and customer loyalty can influence performance through higher prices, higher market share, and/or lower costs (e g , Fornell 1992, Slater and Narver 1994b) By enhancing competitive advantage, innovativeness should have a positive effect on performance (Han, Kim, and Srivastava 1998, Hurley and Hult 1998) Therefore, market orientation can improve an organization's performance by enhancing the satisfaction and loyalty of its customers, the quality of its products and services, and its innovativeness

In estimating the model, the inclusion of customer satisfaction in the analysis was precluded by multicollinearity Before estimating this model, as Baron and Kenny (1986) recommend, we used regression analysis to confirm the mediating effects of customer loyalty, customer satisfaction, quality, and innovativeness on the market orientation–performance relationship As Table 5 summarizes, analysis of the initial consequences model did not result in adequate model fit (χ^2 = 48 37, d f = 4, $p <$ 001, RMSEA = 27, AGFI = 58, NFI = 71, and RMSR = 12) Therefore, and consistent with the modification indices, we revised the model as shown in Figure 2, Panel B The goodness-of-fit indices and path coefficients that we report in Table 5 suggest an acceptable fit for the revised model (χ^2 = 2 97, d f = 4, p = 44, RMSEA = 00, AGFI = 97, NFI = 98, and RMSR = 03) Notably, subsequent evaluation of prior literature provided support for the revised model Market orientation affects a firm's innovativeness (e g , Han, Kim, and Srivastava 1998), and new products enable the organization to meet the evolving needs of customers, thus influencing loyalty and the perceived quality of its products and services (Slater and Narver 1994b) Subsequent analyses of the total (β = 30, $p <$ 05) and indirect effects (β = 13, $p <$ 05) of market orientation on performance also suggest that innovativeness, customer loyalty, and quality account for a substantial portion of the total effect of market orientation on performance, thus demonstrating partial mediation of this relationship through customer- and innovation-related mechanisms Finally, the direct path between market orientation and performance suggests that market orientation has an impact on performance beyond the mediated effects that we examined (β = 17, $p <$ 10) We discuss implications of the findings for research and practice subsequently

Market Orientation–Performance Relationship: Sample and Measurement Characteristics as Moderators

We examined the homogeneity of effects for the market orientation–performance relationship using the procedures that Hedges and Olkin (1985) recommend The statistically significant chi-square value (χ^2_{173} = 2172 9, $p <$ 01) reveals variability across effect sizes and supports the need to examine theoretically relevant sample and measurement characteristics that explain the variance (Hunter and Schmidt 1990) Therefore, we examined the moderating effects of measurement characteristics (i e , cost-based versus revenue-based, objective versus subjective, and single-versus multi-item measures of performance) and sample

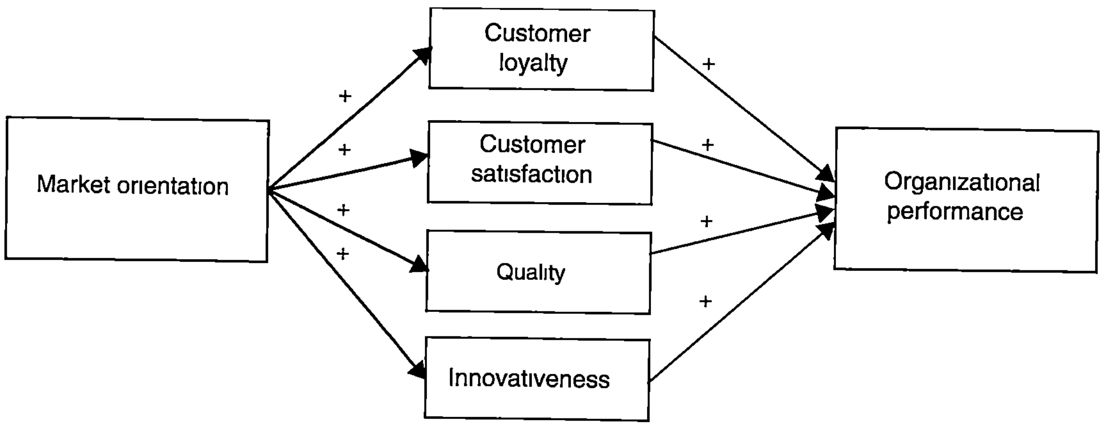
TABLE 4
Consequences: Intercorrelations Among Constructs

	1	2	3	4	5	6
1 Market orientation	83					
2 Organizational performance	27	81				
3 Customer loyalty	27	33	85			
4 Customer satisfaction	35	35	68	82		
5 Innovativeness	35	29	40	26	78	
6 Quality	28	29	22	67	50	78

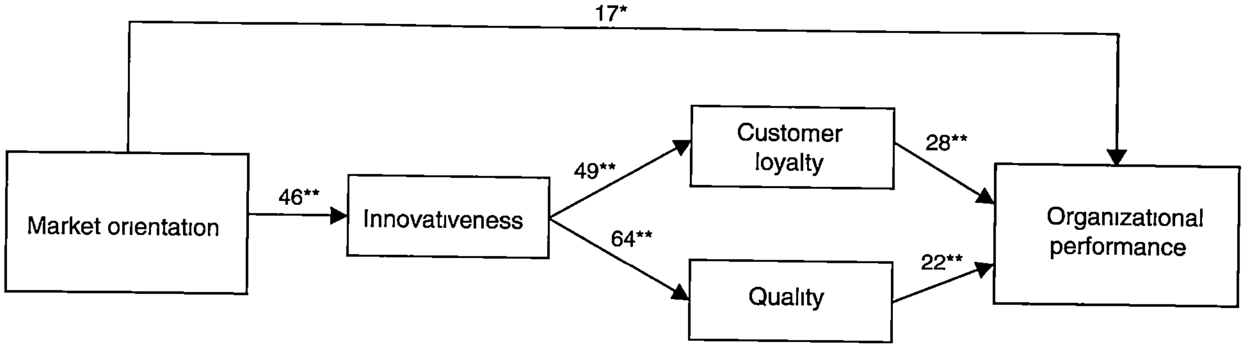
Notes Off-diagonal entries represent the average sample-size-weighted correlation (r) values Entries on the diagonal reflect sample-size-weighted mean reliabilities (Cronbach's α)

FIGURE 2
Consequences of Market Orientation

A: Hypothesized Model



B: Revised Model



*p < 10
**p < 05

characteristics (i e , manufacturing versus service firms and cultural context) on the market orientation–performance relationship using regression analysis (see Brown and Peterson 1993, Szymanski, Bharadwaj, and Varadarajan 1993) Such an investigation also provides an opportunity to address inconsistencies in previous research with the market orientation–performance relationship Consistent with the approach that Tellis (1988) follows, we now present hypotheses to guide the moderator analyses

Hypothesized Effects

Cost-based versus revenue-based performance measures As we noted previously, organizational performance can be classified into measures that account for the costs involved in implementing a strategy versus measures that emphasize revenues that do not reflect costs Thus, we examine whether the impact of market orientation on performance varies between measures of cost-based performance (i e , profits) and revenue-based performance (i e , sales and market share) (Harris 2001, Jaworski and Kohli 1996) Jaworski and Kohli (1993) argue that though market orientation enhances sales performance, the cost of its implementation might reduce profits Market orientation may also be more consistent with a revenue emphasis that targets the expansion of the sales and market share of the firm than with a cost emphasis that focuses more on the efficiency of the firm's processes (Rust, Moorman, and Dickson 2002) Thus

> H_1 The market orientation–performance relationship is stronger for revenue-based performance measures than for cost-based performance measures

Objective versus subjective and single- versus multi-item performance measures The strength of the relationship between market orientation and organizational performance that we assessed using subjective evaluations of performance might differ from relationship tests based on objective measures of performance (Harris 2001) Common methods variance may strengthen the correlation between market orientation and performance when research uses subjective measures to capture both constructs (Doty and Glick 1998) The use of multi-item measures of performance should also be associated with higher market orientation–performance correlations than the use of single-

TABLE 5
Model Estimation Results: Mediating Effects on the Market Orientation–Performance Relationship

	Hypothesized Model		Revised Model	
	Path Coefficient	t-Value	Path Coefficient	t-Value
Market orientation–customer loyalty	37	4 07**	—	—
Market orientation–quality	41	4 34**	—	—
Market orientation–innovativeness	50	5 42**	46	5 03**
Customer loyalty–organizational performance	30	3 28**	28	2 98**
Quality–organizational performance	23	2 47**	22	2 27**
Innovativeness–organizational performance	12	1 28	—	—
Innovativeness–customer loyalty	—	—	49	5 53**
Innovativeness–quality	—	—	64	7 18**
Market orientation–organizational performance	—	—	17	1 78*
	χ^2(d f) = 48 37(4)		χ^2(d f) = 2 97(4)	
	RMSEA = 27		RMSEA = 00	
	AGFI = 58		AGFI = 97	
	NFI = 71		NFI = 98	
	RMSR = 12		RMSR = 03	

*$p <$ 10
**$p <$ 05
Notes Error variances for each construct indicator were fixed at (1 – α), where α is the sample-size-weighted average reliability across studies (see Geyskens, Steenkamp, and Kumar 1998), and the median sample size across studies (n = 157) was used for estimation purposes (see Henard and Szymanski 2001)

item measures because multi-item measures are more capable of capturing various facets of complex constructs (Churchill 1979, Clark and Watson 1995, Henard and Szymanski 2001) Thus

H_2 The market orientation–performance relationship is stronger for subjective measures of performance than for objective measures of performance

H_3 The market orientation–performance relationship is stronger for multi-item measures of performance than for single-item measures of performance

Manufacturing versus service firms Services are less tangible, less separable in production and consumption, and more perishable than manufactured goods (Parasuraman, Zeithaml, and Berry 1985) Because market orientation focuses on meeting customer needs, the fulfillment of customer needs involves a higher degree of customization in service firms than in manufacturing firms (Anderson, Fornell, and Rust 1997) Therefore, the implementation of market orientation could entail a higher degree of customization in service firms than in manufacturing firms, which implies that the correlation of market orientation with organizational performance might vary between manufacturing and service firms Specifically, the relatively higher levels of customization that service firms must use to implement market orientation imply the need to target smaller customer segments, thereby constraining service firms' ability to increase sales and market share (revenue-based performance measures) to the same extent as manufacturing firms Higher degrees of customization in services could also result in higher costs due to lower production efficiency and the hiring and training of qualified employees (see Anderson, Fornell, and Rust 1997) In turn, such higher costs should generate lower levels of profit (i e , cost-based performance) for service firms than for manufacturing firms Thus

H_4 The market orientation–performance relationship is stronger in manufacturing firms than in service firms

H_{4a} The market orientation–performance relationship is stronger for revenue-based performance measures in manufacturing firms than in service firms

H_{4b} The market orientation–performance relationship is stronger for cost-based performance measures in manufacturing firms than in service firms

Cultural context The magnitude of the market orientation–performance relationship may also be country or region specific because of differences in cultural values (Grewal and Tansuhaj 2001, Harris 2001) To examine this variation, we used Hofstede's (2001) dimensions of national culture (i e , power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation) as moderators of the market orientation–performance relationship Specifically, using Hofstede's country scores, we arranged countries for which data were collected from low to high for each cultural dimension and used median splits to classify the countries as either low or high on each dimension We based median splits on the entire set of countries in Hofstede's (2001) work because of the preponderance of U S -based studies in the sample The meta-analysis included studies conducted in the United States, the United Kingdom, Australia, Hong Kong, New Zealand, the Netherlands, China, Finland, Spain, Israel, Japan, Greece, Korea, Saudi Arabia, Taiwan, Zimbabwe, France, Germany, India, Indonesia, Malta, Poland, Slovenia, Thailand, and Turkey We did not include studies that were conducted across regions spanning multiple countries, such as the European Union, in the analysis

According to Hofstede (2001), the power-distance dimension of national culture represents the degree to which social inequalities, such as wealth, status, and power, are natural and acceptable among members of a society The individualism dimension focuses on how people relate to others Whereas individualist societies tend to prefer loosely knit social frameworks in which individuals are primarily responsible for themselves and exhibit greater self-determination, collectivist cultures tend to prefer greater collaboration and group orientation Uncertainty avoidance reflects the tendency to seek stability and predictability, masculinity represents the focus on achievement, assertiveness, and material success, and long-term orientation is a cultural disposition that emphasizes values of persistence, thrift, and loyalty

Employees in low-power-distance cultures, compared with those in high-power-distance cultures, are likely to be more comfortable with and productive in the less-hierarchical structures that are supportive of market orientation (Nakata and Sivakumar 2001) Similarly, employees in countries that rank low on uncertainty avoidance, compared with those in countries that rank high, should be more effective and productive in the less-formalized structures that are associated with market-oriented organizations (see Hofstede 2001) Therefore, firms might implement market orientation more effectively in countries that score low on either power distance or uncertainty avoidance, and market orientation should have a stronger impact on performance in such contexts

Collectivist cultures should support greater collaboration within the organization, thereby enhancing information dissemination and use and enabling a more effective implementation of market orientation (Nakata and Sivakumar 2001) As such, we posit that market orientation has a stronger association with performance in countries that rank low rather than high on individualism We also predict that the relationship between market orientation and performance is stronger in countries that rank high rather than low on masculinity because a firm can implement market orientation more effectively in highly masculine societies in which dominant values such as challenge and material success drive a focus on competing successfully through meeting customer needs (Nakata and Sivakumar 2001) Finally, because market orientation promotes durable relationships with customers (Slater and Narver 1994b), it might be more effective and demonstrate higher correlations with performance in more long-term-oriented cultures Thus

H_5 The market orientation–performance relationship is stronger in low-power-distance cultures than in high-power-distance cultures

H_6 The market orientation–performance relationship is stronger in low-uncertainty-avoidance cultures than in high-uncertainty-avoidance cultures

H_7 The market orientation–performance relationship is stronger in collectivist cultures than in individualist cultures

H_8 The market orientation–performance relationship is stronger in high-masculinity cultures than in low-masculinity cultures

H_9 The market orientation–performance relationship is stronger in long-term-oriented cultures than in short-term-oriented cultures

Regression analysis We used dummy-variable regression to test the hypotheses (e g , Tellis 1988) We dummy coded and used measurement and sample characteristics as independent variables in the following regression model

$$Z_{MO,P} = \beta_0 + \beta_1X_1 + \beta_{1a}X_{1a} + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_I,$$

where $Z_{MO,P}$ is the z-transformed value of the corrected correlation between market orientation and performance, βs are parameter estimates, and X_i are the following categorical variables (with the reference level [the level dummy coded '0'] presented first for each X_i)

X_1 = cost-based performance versus revenue-based performance,
X_{1a} = cost-based performance versus overall business performance,
X_2 = objective versus subjective performance measures,
X_3 = single- versus multi-item performance measures,
X_4 = manufacturing versus service firms,
X_5 = low versus high power distance,
X_6 = low versus high uncertainty avoidance,
X_7 = low versus high individualism,
X_8 = low versus high masculinity, and
X_9 = low versus high long-term orientation

Regression results The regression analysis results, which we summarize in Table 6, demonstrate that the proposed model is significant ($F_{(9, 73)} = 9\ 53$, $p <\ 01$) and that the hypothesized moderators account for 54% of the variance in market orientation–performance correlations (cf Geyskens, Steenkamp, and Kumar 1998 63%, Sultan, Farley, and Lehmann 1990 39%, 45%, and 53%, Tellis 1988 29%) Moreover, the regression model is free of multicollinearity (max variance inflation factor = 2 72) after the exclusion of long-term orientation (variance inflation factor = 17 32)[4]

The regression results indicate that the strength of the relationship between market orientation and organizational performance does not vary across cost-based versus revenue-based performance measures, contrary to the prediction in H_1 (β = – 04, t-value = 46) H_2 predicts that subjective measures of performance yield higher market orientation–performance correlations than those obtained when objective measures are used The results support this hypothesis (β = 33, t-value = 3 08) However, the use of single- versus multi-item performance measures does not affect the strength of the market orientation–performance relationship (β = 06, t-value = 49) Thus, the results do not support H_3 Because we made adjustments for measurement reliability by using reliability-corrected correlations in the regression analysis, this finding implies that the use of

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[4] We included dummy variables for the type of market orientation scale (i e , Narver and Slater's [1990] MKTOR versus Kohli, Jaworski, and Kumar's [1993] MARKOR), journal quality (i e , top tier versus second tier versus other journals based on Baumgartner and Pieters [2003]), date of publication (1990–1996 versus 1997–1999 versus 2000–2004), and business cycles in preliminary analyses as control variables These variables were not significant, and thus we excluded them from further analyses

TABLE 6
Variance in the Market Orientation–Performance Relationship: Test of Hypotheses

Predictor Variables (Reference Level Stated First)	Model 1		Model 2		Model 3	
	Hypotheses	β^a (t-Value)	Hypotheses	β^a (t-Value)	Hypotheses	β^a (t-Value)
Performance Measure Type						
Cost-based versus revenue-based performance	H_1	– 04 (46)		—		—
Cost-based versus overall business performance[b]	—	12 (1 17)		—		—
Other Measurement Characteristics						
Objective versus subjective performance measures	H_2	33 (3 08)**		34 (3 02)**		34 (3 02)**
Single- versus multi-item performance measures	H_3	06 (49)		04 (32)		04 (32)
Sample Characteristics						
Manufacturing versus service firms	H_4	– 43 (4 81)**		—		—
Manufacturing revenue-based performance versus service revenue-based performance	—	—	H_{4a}	– 31 (3 03)**		—
Manufacturing cost-based performance versus service cost-based performance	—	—	—	—	H_{4b}	– 30 (2 94)**
Cultural Context						
Low versus high uncertainty avoidance	H_5	– 18 (1 91)*		– 17 (1 75)*		– 17 (1 75)*
Low versus high power distance	H_6	– 29 (2 39)**		– 25 (1 96)*		– 25 (1 96)*
Low versus high individualism	H_7	– 10 (85)		– 07 (60)		– 07 (60)
Low versus high masculinity	H_8	14 (1 28)		08 (66)		08 (66)
Low versus high long-term orientation	H_9	—		—		—
F-statistic		9 53**		7 32**		7 32**
Degrees of freedom		9, 73		10, 72		10, 72
R^2		54		50		50

*$p < 10$

**$p < 05$

[a] Standardized coefficients

[b] Overall business performance refers to performance measures that cannot be disaggregated into cost-based and revenue-based measures as shown in Table 1

multi-item performance measures does not necessarily enhance market orientation–performance correlations beyond inherent reliability differences (Churchill 1979). Thus, apart from the impact of subjective performance measures, the market orientation–performance relationship is largely robust across various measurement characteristics.

The results also reveal that the market orientation–performance relationship is stronger for manufacturing firms than for service firms, as we predict in H_4 ($\beta = -.43$, t-value = 4.81). To test H_{4a} and H_{4b}, we ran two additional regression analyses that incorporated four categorical variables that represent combinations of the industry context (i.e., manufacturing and service) and the type of performance measure (i.e., cost-based and revenue-based performance). The additional regression models also incorporated all the other variables that appear in Table 6 except for manufacturing versus service firm and cost-based versus revenue-based performance dichotomous variables (i.e., X_1 and X_4), which are redundant when the combination variables are entered into the new equations (see Wooldridge 2003). For all the other independent variables, the results of the additional regressions are similar (see Models 2 and 3 in Table 6).

To test H_{4a}, revenue-based performance in manufacturing firms was the reference category in Model 2 (see Table 6). As we predicted, the results show that the correlation between market orientation and revenue-based performance is lower in service firms than in manufacturing firms ($\beta = -.31$, t-value = 3.03). For H_{4b}, manufacturing firms' cost-based performance was the reference category, which enabled comparisons with service firms' cost-based performance. As we expected, the correlation between market orientation and cost-based performance is lower in service firms than in manufacturing firms ($\beta = -.30$, t-value = 2.94). Thus, manufacturing firms, as compared with service firms, generate higher profits and appeal to larger markets when they implement market orientation, possibly because of the lower levels of required customization.

Two of the four cultural dimensions affect the market orientation–performance relationship. In support of H_5, the regression results suggest that market orientation–performance correlations are higher in low-uncertainty-avoidance cultures than in high-uncertainty-avoidance cultures ($\beta = -.18$, t-value = 1.91). In support of H_6, market orientation–performance correlations are higher in low-power-distance cultures than in high-power-distance cultures ($\beta = -.29$, t-value = 2.39). The estimates for individualism (H_7) and masculinity (H_8) as moderators of the market orientation–performance association are not significant.

The findings also enable a qualitative assessment of studies that provide negative or nonsignificant associations between market orientation and performance. Although the grand mean of the correlation between market orientation and performance is positive (i.e., r = .32), the extant literature includes several studies that report a negative or nonsignificant association for this relationship (e.g., Agarwal, Erramilli, and Dev 2003; Au and Tse 1995; Bhuian 1997; Greenley 1995; Sandvik and Sandvik 2004; Sargeant and Mohamad 1999). On the basis of the results from the regression analysis, we examined the sample and measurement characteristics of these specific studies. We found that, except for Greenley (1995), these studies typically have at least two of the following three sample and measurement characteristics that significantly affect the market orientation–performance correlation: a service industry sample, data collected in countries that rank high on power distance, and objective measures of performance. Thus, it appears that when a study design combines sample and measurement characteristics that dampen the market orientation–performance correlation, a negative association or no association between these variables may materialize.

In summary, the results of the regression analyses indicate that the variance in the strength of the market orientation–performance relationship can be partially attributed to systematic differences in several theoretically expected sample and measurement characteristics. We discuss the managerial and research implications of these results after the analysis of three substantive moderators of the market orientation–performance relationship.

Market Orientation–Performance Relationship: Substantive Moderators

Although consistent with prior meta-analyses, the focus on measurement and sample characteristics as moderators of the market orientation–performance relationship leaves one issue unresolved. Specifically, the overall impact of three previously investigated substantive moderators (i.e., market/environmental turbulence, technological turbulence, and competitive intensity) on the market orientation–performance relationship also warrants consideration (e.g., Grewal and Tansuhaj 2001; Slater and Narver 1994a). Prior research has proposed that market and technological turbulence in the environment, as well as competitive intensity, moderates the strength of the relationship between market orientation and performance (Harris 2001; Slater and Narver 1994a). We expect market turbulence and competitive intensity to enhance the impact of market orientation on performance because market responsiveness is likely to become more important when an organization is faced with an evolving mix of customers and aggressive competitors (Jaworski and Kohli 1993). In contrast, the extant literature predicts that technological turbulence is likely to diminish the impact of market orientation on performance because when technology is changing rapidly, research and development–driven innovation becomes more important to a firm's performance than does the customer-focused innovation that results from market orientation (Grewal and Tansuhaj 2001; Kohli and Jaworski 1990).

A limited number of effects precluded detailed quantitative analyses of the substantive moderators. Therefore, we used a vote-counting procedure in which we categorized prior studies on the basis of the direction and significance of the findings (Bottomley and Holden 2001; Capon, Farley, and Hoenig 1990). As Bushman (1994, p. 195) details, we used a nonparametric "sign test," which tests the hypothesis that the effect sizes from a collection of k independent studies are all zero (null hypothesis, H_0 $\pi = 5$) This procedure investigates the probability of obtaining results that confirm the proposed hypotheses greater than 5 (alternative hypothesis, H_A $\pi > 5$) Accordingly, we categorized studies that explore the moderators of the market orientation–performance relationship into "supportive," "opposite," and "nonsignificant effects" (see Table 7) on the basis of the significance and direction of the results Next, we counted the number of studies that confirm the hypotheses, and we calculated and evaluated an estimate of π (i e , the proportion of statistically significant results that support the proposed hypotheses in the population) using critical values from the binomial distribution

In 5 of 14 studies, market/environmental turbulence was found to moderate the market orientation–performance relationship such that the strength of the relationship between market orientation and performance is stronger in turbulent markets Using the sign test described previously, the estimate of π is $p =$ 36 (or 5/14), which corresponds to a cumulative probability of 79 from a binomial table Thus, the nonparametric sign test results indicate that there is insufficient empirical evidence to conclude that market/environmental turbulence is a significant moderator of the relationship between market orientation and performance Similarly, sign tests did not support the moderating roles of competitive intensity and technological turbulence on the market orientation–performance relationship

Discussion and Implications

The meta-analysis reported in this study provides a quantitative summary of bivariate relationships that involve market orientation to document research in this substantial literature stream The multivariate analyses reveal that internal processes have a greater influence than organizational structure variables in implementing market orientation and that market orientation affects performance through innovativeness, customer loyalty, and quality An examination of the variance in the market orientation–performance relationship with regression analyses demonstrates that manufacturing firms exhibit higher market orientation–performance associations than do service firms, assesses the generalizability of the relationship across various cultural contexts, and provides research guidance on the effects of performance-measure-related issues A nonparametric assessment of prior research into the substantive moderators of the market orientation–performance relationship indicates that the extant research provides limited support for the effects of

TABLE 7
Substantive Moderators and the Market Orientation–Performance Relationship

Moderator	Supportive	Opposite	Nonsignificant
Market/ environmental turbulence	Appiah-Adu (1997) Diamantopoulos and Hart (1993) Harris (2001) Kumar, Subramanian, and Yauger (1998) Pulendran, Speed, and Widing (2000)	Greenley (1995) Slater and Narver (1994a)	Becherer and Maurer (1997) Cadogan, Diamantopoulos, and Siguaw (2002) Gray et al (1999) Jaworski and Kohli (1993) Rose and Shoham (2002) Subramanian and Gopalakrishna (2001) Tay and Morgan (2002)
Competitive intensity	Bhuian (1998) Diamantopoulos and Hart (1993) Grewal and Tansujah (2001) Harris (2001) Kumar, Subramanian, and Yauger (1998)		Appiah-Adu (1997) Appiah-Adu (1998) Cadogan, Cui, and Li (2003) Gray et al (1999) Jaworski and Kohli (1993) Kwon and Hu (2000) Slater and Narver (1994a) Perry and Shao (2002) Tay and Morgan (2002) Pulendran, Speed, and Widing (2000) Rose and Shoham (2002) Subramanian and Gopalakrishna (2001)
Technological turbulence	Rose and Shoham (2002)	Grewal and Tansuhaj (2001) Slater and Narver (1994a)	Appiah-Adu (1997) Bhuian (1998) Cadogan, Cui, and Li (2003) Harris (2001) Gray et al (1999) Greenley (1995) Jaworski and Kohli (1993) Pulendran, Speed, and Widing (2000)

Notes Other less frequently studied moderators of the market orientation–performance relationship that we found in the literature include market growth, buyer power, demand uncertainty, supplier power, and extent of entry barriers environmental factors on the market orientation–performance relationship

In this regard, this study extends prior attempts to summarize the extant market orientation literature by employing a considerably larger number of effect sizes and investigating more comprehensive models Specifically, previous attempts to consolidate research findings in the market orientation literature include qualitative reviews (e g , Jaworski and Kohli 1996, Lafferty and Hult 2000) and a meta-analysis focused on the market orientation–performance relationship (see Cano, Carrillat, and Jaramillo 2004) In contrast to our study, Cano, Carrillat, and Jaramillo's (2004) meta-analysis provides a quantitative summary of the market orientation–performance relationship alone, and using subgroup analysis, it offers some preliminary evidence of how this relationship varies across sample and measurement characteristics Apart from the broader scope of our study, which also has a considerably larger database, we examine the impact of a larger set of sample and measurement characteristics, such as cost-based and revenue-based performance, and multiple dimensions of culture By doing so, we are able to infer well-supported managerial implications and several interesting research implications In addition, the use of multiple regression rather than subgroup analysis enables us to limit the problems associated with omitted-variable bias by employing several control variables, such as the type of market orientation scale, journal quality, and business cycles For example, although a bivariate analysis shows that the type of market orientation scale would have a significant impact on the market orientation–performance correlation, this association vanishes in the presence of other sample and measurement characteristics

However, this research has several limitations that are common to other meta-analyses in the marketing literature First, we could not include all studies and constructs in the market orientation literature because of a lack of information necessary for the calculation of effect sizes Second, the number of variables that we could include in the multivariate models was limited because we used only the constructs that yielded a full correlation matrix in the analyses Third, the study was limited to the examination of moderators that we could code from existing studies Regardless, the findings from this meta-analysis could be useful to managers in their efforts to implement market orientation and to understand its impact on performance The results could also help researchers assess the state of market orientation literature and design further research

Managerial Implications

Managers are concerned about four issues pertaining to market orientation First, how can market orientation be implemented? Second, what is its impact on performance? Third, how does the market orientation–performance relationship vary across cultural and business contexts? Fourth, what are the processes through which market orientation enhances performance? The meta-analysis provides insights into each of these issues

Implementing market orientation The results from the multivariate analysis of antecedents of market orientation demonstrate the importance of top management emphasis, interdepartmental connectedness, and market-based reward systems for the implementation of market orientation (Ruekert 1992) Notably, we find that centralization may not hamper market orientation, which implies that an organization with a centralized decision-making structure can prevent that structure from impeding the information flow that is critical for market orientation by focusing on top management emphasis, interdepartmental connectedness, and appropriate reward systems That is, by ensuring top management emphasis, interdepartmental connectedness, and appropriate reward systems, market orientation can be effectively implemented even in organizations with centralized decision-making structures

Market orientation–performance relationship Overall, the results demonstrate that market orientation has a positive impact on organizational performance Although this conclusion is consistent with several studies in the market orientation literature (see Jaworski and Kohli 1993, Narver and Slater 1990), the present meta-analysis provides managers with a mean value for the expected effect (r = 32) More important, the results help focus managers' attention that market orientation enhances profits (r = 27), which is a cost-based performance measure that accounts for the cost of implementing market orientation, and not merely revenue-based performance measures (r = 26) Although Rust, Moorman, and Dickson (2002) note that market orientation may not be entirely consistent with a focus on cost reduction, our results show that it does enhance profits In other words, even though the implementation of market orientation may demand resources, it generates profits over and above the costs involved in its implementation while growing revenues

Impact of industry and cultural contexts The association of market orientation with performance is lower in service firms than in manufacturing firms (r = 26 versus 37, respectively), possibly because of the higher levels of customization that service firms require This result varies from Cano, Carrillat, and Jaramillo's (2004) study, in which through the use of subgroup analysis, they report a higher market orientation–performance correlation for service firms However, the use of a larger database (47 versus 15 effects for service firms and 76 versus 23 effects for manufacturing firms in this study versus Cano, Carrillat, and Jaramillo's) and a more rigorous multiple regression analysis rather than subgroup analysis suggests that, on the aggregate, the relationship between market orientation and performance is stronger in manufacturing firms than in service firms Furthermore, the extant theory in marketing, as documented by Anderson, Fornell, and Rust (1997), also supports the current findings

This result is noteworthy because research designed directly to compare market orientation in service firms with that in manufacturing firms is scarce However, this finding does not necessarily imply that market orientation should receive a greater emphasis in manufacturing than in service firms We note that this result refers to the strength of the market orientation–performance association in manufacturing and service firms and not to the level of market orientation Market orientation might be more integral to service firms because of the greater necessity of direct firm–

customer interactions Therefore, market orientation could be viewed as a failure-prevention approach (a "hygiene" factor) in service firms and a success-inducing approach in manufacturing firms (see Varadarajan 1985) In other words, market orientation may be imperative to ensure survival in service firms and may provide a greater competitive advantage that leads to superior performance in manufacturing firms

Managers should also note that the association between market orientation and performance varied across two of the four national culture dimensions that we tested in the moderator analyses Specifically, we found market orientation to be more positively associated with performance in countries that are low rather than high on power distance (r = 33 versus 27) In addition, we found market orientation to be more positively associated with performance in countries that are low rather than high on uncertainty avoidance (r = 34 versus 27) Therefore, managers should implement market orientation in accordance with local cultural sensitivities as power distance and uncertainty avoidance describe

Mediating processes of the market orientation–performance relationship From a managerial perspective, the explication of the routes through which market orientation influences performance is vital We examine a more comprehensive model of the mechanisms that mediate the market orientation–performance relationship than those tested in the extant literature (e g , Han, Kim, and Srivastava 1998, Matsuno, Mentzer, and Ozsomer 2002), and we provide managers with more detailed insights into market orientation's influence on performance Our findings suggest that measures of the mediating variables—innovativeness, customer loyalty, and quality—may be useful for tracking the impact of market orientation on performance for managers who implement strategic process-measurement frameworks, such as the Balanced Scorecard (see Kaplan and Norton 1993)

Research Implications

Based on the evidence from the meta-analysis, research has made significant progress toward the understanding of the market orientation construct and its nomological network However, despite the progress, there are several gaps in knowledge about the implementation of market orientation and the market orientation–performance relationship, thus suggesting avenues for further research

Implementing market orientation The findings from the meta-analysis about the antecedents of market orientation suggest the following directions for further research First, researchers must examine how the antecedents of market orientation interact and impact its implementation Thus, complex relationships, such as the interaction of centralization and market-based reward systems or interdepartmental connectedness and the impact on implementation of market orientation, are fertile topics for further research

Second, the extant literature needs a better understanding of how the impact of the antecedents of market orientation varies across different business and cultural contexts Thus, further research should identify profiles of best practices to implement market orientation both in service and manufacturing firms and in different cultural contexts

Third, the use of customer relationship management technology enables organizations to discover or anticipate continuously what customers need and to fulfill those needs with customized products and services (Bradley and Nolan 1998) Therefore, the use of customer relationship management technology can facilitate more efficient and effective realization of market orientation, and it represents an important topic for further research

Explicating the market orientation–performance relationship Our results suggest that research into the following four topics would help enhance knowledge about the market orientation–performance relationship First, the variance in the market orientation–performance correlations across service and manufacturing contexts is attributed to the higher levels of customization that service firms require and to the subsequent costs involved (Anderson, Fornell, and Rust 1997) To provide further insights into this area, a study examining how customization affects the market orientation–performance relationship would be useful Researchers could conduct such a study across organizations that offer products or services that require varying degrees of customization

Second, studies that showed a negative association between market orientation and performance had the following characteristics service industry sample, high-power-distance culture, and objective performance measure To further enhance the understanding of the combinations of conditions that limit the effectiveness of market orientation in improving performance, a study with a 2 (service/manufacturing) × 2 (high/low power distance) design with multiple types of performance measures would be beneficial

Third, prior research has suggested that reducing role conflict enhances quality and, consequently, performance (e g , Hartline and Ferrell 1996) Because studies have shown market orientation to reduce role conflict, it is likely that its impact on performance is mediated through role conflict Data limitations prevented us from examining the mediating role of role conflict, other employee-related consequences, and customer satisfaction on the market orientation–performance relationship Examining the mediating role of employee-related consequences and customer satisfaction might help further clarify the processes that mediate the market orientation–performance relationship

Fourth, multicollinearity prevented us from assessing the impact of long-term orientation on the market orientation–performance relationship Therefore, further research is warranted in which variation is accomplished across long-term orientation and other dimensions of culture while estimating the market orientation–performance relationship

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Kevin Zheng Zhou, Chi Kin (Bennett) Yim, & David K. Tse

The Effects of Strategic Orientations on Technology- and Market-Based Breakthrough Innovations

Does market orientation impede breakthrough innovation? To date, researchers have presented opposing arguments with respect to this important issue To address this controversy, the authors conceptualize and empirically test a model that links different types of strategic orientations and market forces, through organizational learning, to breakthrough innovations and firm performance The results show that a market orientation facilitates innovations that use advanced technology and offer greater benefits to mainstream customers (i e , technology-based innovations) but inhibits innovations that target emerging market segments (i e , market-based innovations) A technology orientation is beneficial to technology-based innovations but has no impact on market-based innovations, and an entrepreneurial orientation facilitates both types of breakthroughs Different market forces (demand uncertainty, technology turbulence, and competitive intensity) exert significant influence on technology- and market-based innovations, and these two types of innovations affect firm performance differently The results have significant implications for firm strategies to facilitate product innovations and achieve competitive advantages

A market orientation endorses the classic marketing tenet that urges firms to stay close to their customers and put their customers at the top of the organizational chart Various studies have provided empirical support for the positive link between market orientation and firm performance (e g , Jaworski and Kohli 1993, Matsuno, Mentzer, and Ozsomer 2002, Narver and Slater 1990, Slater and Narver 1994) Recent research has further emphasized the role of innovation in facilitating the market orientation–performance relationship (e g , Han, Kim, and Srivastava 1998, Hurley and Hult 1998) With such strong conceptual and empirical support, market orientation has become a pivotal construct that affects a firm's strategy and operation

However, some researchers have raised doubts about the unquestioning focus that firms may place on their markets (e g , Bennett and Cooper 1979, Christensen and Bower 1996, Frosch 1996, Meredith 2002) They caution that an overemphasis on customers could lead to trivial innovations and myopic research and development (R&D), which might lower the firm's innovative competence Because customers are inherently shortsighted, market-oriented firms may risk losing the foresight of innovating creatively in their attempt to serve customers' existing needs (Hamel and Prahalad 1994) Moreover, customers do not necessarily know what they really want, because they are not completely knowledgeable about the latest market trends or technologies (MacDonald 1995, Von Hippel 1988) Thus, being market oriented may not provide a firm with true insight into product innovation (Frosch 1996, Leonard-Barton and Doyle 1996, Workman 1993) Therefore, firms should "ignore your customers" or "don't listen to your customers" while pursuing breakthrough innovations (Martin 1995, p 123, Meredith 2002 p 59)

Whereas early evidence against market orientation was largely anecdotal and drew its implications from selected case studies, Christensen and Bower (1996) add to the criticism with a historical analysis of the computer disk-drive industry They find that financially strong, rationally managed, and well-established leading firms may fail to embrace breakthrough innovations and may be surpassed by competitors because they are too customer oriented Recent studies in *Journal of Marketing* also provide evidence that indirectly bears on this concern For example, Voss and Voss (2000) find that a customer orientation has a negative impact on firm performance in professional theaters, possibly because of the lack of breakthrough innovation Grewal and Tansuhaj (2001) find that a market orientation is detrimental to firm performance after an economic crisis, which they attribute to the lack of foresight of market-oriented firms

The findings have provoked a series of debates Commenting on Christensen and Bower's (1996) work, Slater and Narver (1998, p 1001) distinguish customer-led strategies from market-oriented ones The former focuses on satisfying customers' expressed needs, whereas the latter "goes beyond satisfying expressed needs to understanding and satisfying customers' latent needs" Conner (1999)

Kevin Zheng Zhou is Assistant Professor of Marketing (e-mail kevinzhou@business hku hk), Chi Kin (Bennett) Yim is Associate Professor of Marketing and Associate Director of Chinese Management Centre (e-mail yim@business hku hk), and David K Tse is Chair Professor of International Marketing and Director of Chinese Management Centre (e-mail davidtse@business hku hk), School of Business, The University of Hong Kong The study was supported by research grants from the Research Grant Council, Hong Kong SAR Government, and the Chinese Management Centre, The University of Hong Kong The authors thank the anonymous *JM* reviewers for their insightful and constructive comments They also thank Kimmy Chan and Xiaoyun Chen for their help in data collection

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argues that Slater and Narver's distinction may be too simplistic, and he suggests that to be successful, a firm should balance satisfying its customers' current, expressed needs (i.e., customer-led) with satisfying their future, potential needs (i.e., market-oriented). In response, Slater and Narver (1999) argue that a market orientation considers both expressed and latent needs and thus is more than simply being customer led. Hult and Ketchen (2001) show that as a component of positional advantage, market orientation positively affects firm performance, but they note that the potential value of market orientation should be considered together with other important firm capabilities, such as entrepreneurship and organizational learning. Matsuno, Mentzer, and Ozsomer (2002) also find that entrepreneurship in combination with market orientation positively affects firm performance. They encourage additional research to inquire into the process by which firms implement strategic orientations, such as through organizational learning. Most recently, Im and Workman (2004) find that a customer orientation is the driving force of new product success, despite its negative effect on new product novelty. They recommend further studies to examine innovation and its performance implications directly and together with other intangible assets, such as entrepreneurship.

Despite growing interest in this debate, the central issue of whether market orientation facilitates or impedes breakthrough innovation remains unanswered. In this study, we present a model that links strategic orientation, market force, organizational learning, breakthrough innovation, and firm performance in an attempt to contribute to the literature in four ways. First, we differentiate between two types of breakthrough innovations (i.e., technology versus market based) and argue that market orientation may have both positive and negative effects, depending on the type of innovation. In this way, we provide some insights that may resolve the ongoing debate. Second, we examine two important yet less-researched types of strategic orientations, technology and entrepreneurial, and assess how they affect breakthrough innovations through organizational learning. Third, we investigate the effects of different market forces on breakthrough innovations. Fourth, we explore the differential impacts of technology- and market-based innovations on performance. To our knowledge, this study represents the first attempt to distinguish empirically between technology- and market-based innovations and to assess their performance impacts.

Breakthrough Innovation

Innovation is the generation and/or acceptance of ideas, processes, products, or services that the relevant adopting unit perceives as new (García and Calantone 2002). It can be new to either the firm or the firm's customers. Depending on their "newness," innovations can be incremental (continuous) or breakthrough (discontinuous). Incremental innovations refer to minor changes in technology, simple product improvements, or line extensions that minimally improve the existing performance. In contrast, breakthrough innovations are novel, unique, or state-of-the-art technological advances in a product category that significantly alter the consumption patterns of a market (Wind and Mahajan 1997).

Recent studies further differentiate two types of breakthrough innovations on the basis of their (1) advances of existing technology and (2) departure from the existing market segment (Benner and Tushman 2003). The first type, which we define as "technology-based innovations" (hereinafter, tech-based innovations), adopts new and advanced technologies and improves customer benefits relative to existing products for customers in existing markets. The second type, which we define as "market-based innovations," departs from serving existing, mainstream markets. Market-based innovations involve new and different technologies and create a set of fringe, and usually new, customer values for emerging markets (Benner and Tushman 2003; Christensen and Bower 1996).

Tech- and market-based innovations differ in both the technology and the market dimensions. On the technology side, though both employ new technologies, the former usually represent state-of-the-art technological advances (Benner and Tushman 2003; Chandy and Tellis 1998). In contrast, the latter are not necessarily technologically advanced; instead, market-based innovations often use simpler new technology (e.g., off-road versus over-the-road motorcycles, personal computers [PCs] versus minicomputers) and sometimes can be new ideas about business operations (e.g., discount retailing such as Wal-Mart versus traditional retailing such as Sears, health maintenance versus conventional health insurance) (Benner and Tushman 2003; Christensen 1997). On the market side, tech-based innovations address the needs of existing markets and provide greater customer benefits than do existing products (Chandy and Tellis 1998). In contrast, market-based innovations are designed for new or emerging markets and offer benefits that the new segments value, and their performance along traditional dimensions often may be worse than that of existing products (Christensen 1997). In other words, they disrupt the existing customer-preference structure by introducing new benefit dimensions. Therefore, market-based innovations are often perceived as highly different, and they require current mainstream customers to undergo major changes in thinking and behavior (Benner and Tushman 2003). Mainstream customers may not easily recognize or appreciate the new benefits, and market-based innovations may be initially difficult for mainstream customers to adopt or use (Adner 2002).

Tech-based innovations that fundamentally change the technological trajectory and improve customer benefits are called "radical innovations" (e.g., color versus black-and-white television, diesel versus steam locomotive, jets versus turbojets) (Benner and Tushman 2003; Chandy and Tellis 1998; Tushman and Anderson 1986). Market-based innovations that improve performance through subsequent development to a level superior to existing products and that eventually overtake existing products in mainstream markets are called "disruptive innovations" (Christensen 1997). The introduction of PCs serves as an example.

Personal computers were designed to meet the needs of customers, such as small businesses and individual customers, who were not served by minicomputers. Mainstream customers of minicomputers were large businesses and organizations that mostly used minicomputers for scientific computation When PCs were introduced, minicomputer users showed little interest, because PCs performed much worse than minicomputers along traditionally valued dimensions, such as scientific computation At that time, PCs were a market-based innovation However, PC technology developed much faster than that of minicomputers Over time, PCs overtook minicomputers, even in the latter's mainstream market As a result, PCs became a disruptive innovation (Christensen 1997, Schnaars 1994)

Both tech- and market-based innovations are highly risky to pursue A tech-based innovation is technologically risky because developing state-of-the-art technology is extremely expensive and requires substantial investment (Sorescu, Chandy, and Prabhu 2003, Wind and Mahajan 1997) However, because it addresses the well-understood needs of mainstream customers, the perceived market risk is low In contrast, a market-based innovation may be technologically straightforward, but it is extremely risky on the market side because the customers do not yet exist (Christensen and Bower 1996) Therefore, companies often are reluctant to invest in either type of innovation In turn, it is important to understand what drives a firm's willingness to undertake risky activities and to introduce breakthroughs to achieve a sustainable competitive advantage

To answer this question, we refer to the competitive force perspective and the resource-based view (RBV), two major theories about how competitive advantage is achieved The former represents an "outside-in" perspective and argues that external market forces, such as demand uncertainty, technological turbulence, and competitive intensity, primarily drive competitive advantage (Porter 1980, 1985) In contrast, the RBV reflects an "inside-out" approach and suggests that a firm's competitive advantage stems from its unique assets and distinctive capabilities (Barney 1991, Wernerfelt 1984) Although the two views diverge, both are influential in the explanation of a firm's competitive advantage Thus, recent studies have encouraged researchers to consider their complementary nature (e g , Spanos and Lioukas 2001) Building on the two views, we present a framework that links a firm's strategic orientations (from the RBV) and market forces (from the competitive force perspective), through organizational learning, to breakthrough innovations and firm performance (see Figure 1)

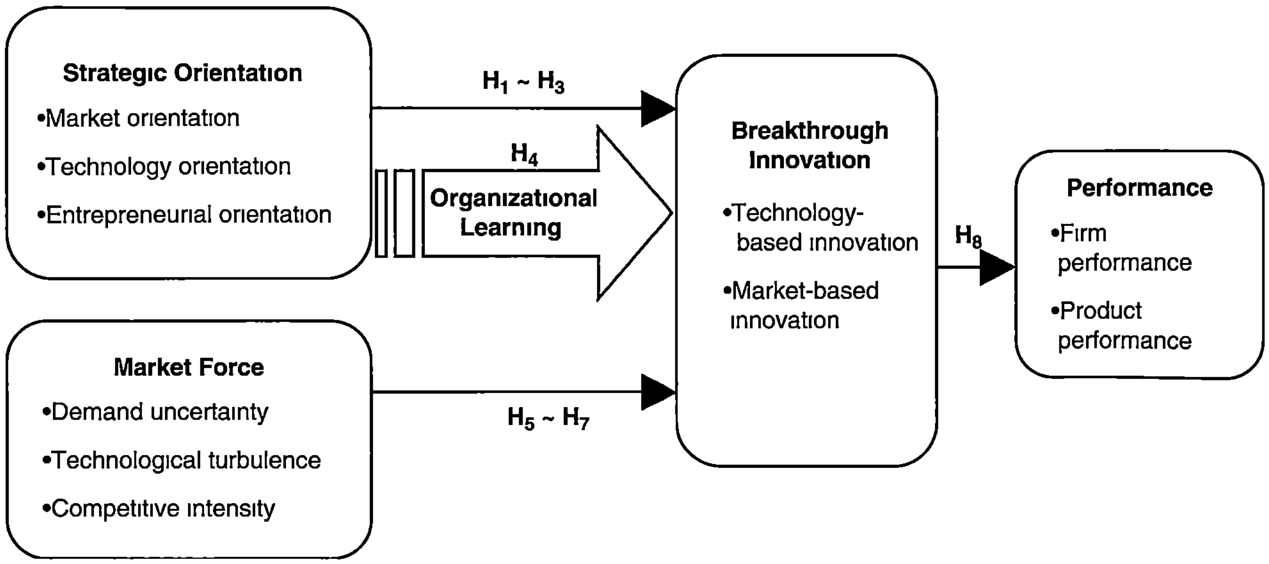
Hypotheses Development

Strategic Orientation and Breakthrough Innovation

The RBV focuses on resource heterogeneity and immobility as potential sources of competitive advantage (Barney 1991) Firm resources can be classified as assets and capabilities (Day 1994, Hunt and Morgan 1995) Assets are the more tangible resources that the organization has accumulated, such as an economy of scale, reputation, spatial preemption, and brand equity Capabilities are the glue that brings these assets together and enables a firm to deploy them advantageously, such as the skills underlying the innovativeness and the superior quality of a firm's offerings Capabilities differ from assets in that they are difficult to quantify monetarily, and they encompass skills that are embedded deeply in organizational routines and practices (Barney 1991, Day 1994)

An important firm capability is its strategic orientation Strategic orientation reflects the firm's philosophy of how to conduct business through a deeply rooted set of values and beliefs that guides the firm's attempt to achieve supe-

FIGURE 1
The Conceptual Model



rior performance (Gatignon and Xuereb 1997) These values and beliefs define the resources to be used, transcend individual capabilities, and unify the resources and capabilities into a cohesive whole (Day 1994) Such capabilities are intangible and interaction based They are difficult to trade, imitate, or duplicate, and thus they are the most likely sources of competitive advantage (Day 1994, Hunt and Morgan 1995)

Our study focuses on three important types of strategic orientations market, technology, and entrepreneurial Market orientation is of central interest because of the market orientation debate we identified previously Technology orientation focuses predominantly on new technologies and thus has direct implications for product innovations (Gatignon and Xuereb 1997, Hamel and Prahalad 1994, Tushman and Anderson 1986) Entrepreneurial orientation also deserves consideration because it has long been recognized as the key for initiating innovative activities (Miller 1983, Slater and Narver 1995)

Market orientation Market orientation places the highest priority on the profitable creation and maintenance of superior customer value (Narver and Slater 1990) It emphasizes the need for the entire organization to acquire, disseminate, and respond to market intelligence from the firm's target buyers and current and potential competitors (Jaworski and Kohli 1993) Some researchers suggest that market orientation is essentially customer orientation (Deshpandé, Farley, and Webster 1993), representing the concept of "customer pull" in a firm's strategic planning and implementation (Day 1994)

By prioritizing customers, a market-oriented firm excels in its ability to seek and use market information to create and deliver superior customer value Unlike a customer-led firm, which simply listens to its customers, a market-oriented firm commits to understanding both the expressed and the latent needs of its customers (Slater and Narver 1999) Its ability to uncover consumers' latent needs can be enhanced further by the lead-user technique, that is, putting the most advanced technology available into the hands of the "most sophisticated and demanding users" often "leads to the discovery of new solutions to unexpressed needs" (Slater and Narver 1998, p 1003, see also Von Hippel, Thomke, and Sonnack 1999)

Such insights are beneficial for fostering tech-based innovations, which can greatly improve customer benefits in existing markets and cater to the needs of the most sophisticated customers (Chandy and Tellis 1998) Although investment in technology is substantial and risky, signs from the market are clear and certain With a strong commitment to serving its customers, a market-oriented firm is willing to direct the resources necessary to fulfill customers' latent needs through developing tech-based innovations (Slater and Narver 1995) Some studies also indicate that many breakthrough innovations are generated from consumers' insights For example, Von Hippel (1988) shows that lead users contribute to a considerable percentage of breakthroughs—some as high as 70%–85%—in various product classes Thus, market orientation is more than being customer led, and it can lead to tech-based innovations

H_{1a} Market orientation has a positive effect on tech-based innovations

The primary focus of a market orientation is to create "superior customer value, which is based on knowledge derived from customer and competitor analysis" (Slater and Narver 1995, p 68) However, such a focus may risk overlooking the potential contributions of other sources, such as firms in different industries (Achrol 1991), threats from new, nontraditional competitors (Stalk, Evans, and Shulman 1992), or opportunities in future markets (Chandy and Tellis 1998), thus lowering the possibility of generating innovations for emerging markets In addition, intelligence generated from existing customers or even lead users may not provide critical guidelines for introducing products that are desired by new markets with different preferences As Von Hippel, Thomke, and Sonnack (1999) note, lead users—the most sophisticated and demanding users of current products—can offer insights into existing value systems but not into markets with different values Im and Workman's (2004) unexpected finding that customer orientation negatively affects new product novelty provides some support for this logic

Although market-based innovations may be straightforward in terms of technology, they are extremely risky on the demand side because managers can only guess at the size of the new market, the profitability of the new products, or the desirable product attributes (Christensen and Bower 1996, Hamel and Prahalad 1994, Tellis and Golder 2001) However, "a market orientation may not encourage a sufficient willingness to take [such] risks   This danger is the result of narrowly focusing market intelligence efforts on *current* customers and competitors, thus ignoring *emerging* markets and/or competitors" (Slater and Narver 1995, p 67, emphasis added) As such, a market-oriented firm may risk itself in the "tyranny of the served market" The firm aggressively pursues tech-based innovations that directly address existing customers' unsatisfied needs and that promise the best return, but it is unlikely to invest substantially in market-based innovations that have an unknown future (Christensen 1997, Hamel and Prahalad 1994) Thus

H_{1b} Market orientation has a negative effect on market-based innovations

Technology orientation Unlike the customer-pull philosophy of market orientation, technology orientation reflects the philosophy of "technological push," which posits that consumers prefer technologically superior products and services (Gatignon and Xuereb 1997, Wind and Mahajan 1997) Accordingly, a technology-oriented firm advocates a commitment to R&D, the acquisition of new technologies, and the application of the latest technology (Gatignon and Xuereb 1997) Although both market and technology orientations promote openness to new ideas, market orientation favors ideas that better satisfy customer needs, whereas technology orientation prefers those that employ state-of-the-art technologies

Because a technology-oriented firm champions the use of the latest technologies in its new products and heavily devotes its resources to R&D, it excels in technical proficiency and flexibility, which are critical drivers for breakthrough innovations (Ali 1994, Workman 1993) Furthermore, in a technology-oriented firm, creativity and invention are the organizational norms and values that guide its activities and strategies A technology-oriented firm tolerates and often encourages employees with "crazy ideas" or an instinctive interest in inventing something drastically new In such a firm, introducing breakthroughs becomes a strategic and cultural priority (Hamel and Prahalad 1994, Hurley and Hult 1998) Because tech-based innovations employ state-of-the-art technology, they should be highly valued by a technology-oriented firm However, a technology-oriented firm may not value market-based innovations, because such innovations may be too technologically straightforward Therefore, we hypothesize the following

H_2 Technology orientation has a positive effect on tech-based innovations

Entrepreneurial orientation Entrepreneurial orientation reflects a firm's propensity to engage in "the pursuit of new market opportunities and the renewal of existing areas of operation" (Hult and Ketchen 2001, p 901) It promotes values such as being highly proactive toward market opportunities, tolerant of risk, and receptive to innovations (Lumpkin and Dess 1996, Matsuno, Mentzer, and Ozsomer 2002) Accordingly, the ability to initiate change, take risks, and innovate distinguishes entrepreneurial firms (Naman and Slevin 1993)

Entrepreneurial orientation highlights the spirit of creating new business out of ongoing practices and rejuvenating stagnant companies, which is often accomplished through the introduction of breakthrough innovations (Lumpkin and Dess 1996) As Miller (1983, p 771) notes, an entrepreneurial firm is one that "engages in product market innovations, undertakes somewhat risky ventures, and is the first to come up with 'proactive' innovations" In particular, the emphasis on being proactive toward new opportunities cultivates capacities that enable the firm to create products not only ahead of competitors but also ahead of the recognition of existing customers (Slater and Narver 1995) Often, this proactive quality requires substantial financial and managerial commitment With its risk-taking nature, an entrepreneurial firm is willing to devote the necessary resources to opportunities that may result in costly failures (Naman and Slevin 1993) In such conditions, both tech- and market-based innovations are likely to occur Therefore, the essential outcome of entrepreneurial orientation is the firm's entry into new or established markets through breakthroughs (Lumpkin and Dess 1996)

H_3 Entrepreneurial orientation has a positive effect on both tech- and market-based innovations

Organizational learning as a mediating process Recently, more effort has been strongly called for to uncover the process (in particular, organizational learning) through which strategic orientations affect organizational outcomes (e g , Matsuno, Mentzer, and Ozsomer 2002, Slater and Narver 1995) Organizational learning represents the development of new knowledge or insights that facilitate performance-enhancing organizational changes (Sinkula 1994, Slater and Narver 1995) Dickson (1992) emphasizes the importance of learning in the transferring of information into knowledge, arguing that in dynamic and turbulent markets, the ability to learn more quickly than competitors may be the only source of sustainable competitive advantage Slater and Narver (1995, p 63) concur "[T]he critical challenge for any business is to create the combination of culture and climate that maximizes organizational learning" They further indicate that market-oriented and entrepreneurial cultures, with their focus on market information processing and proactivity toward change, greatly enhance a firm's ability to learn Similarly, Noble, Sinha, and Kumar (2002) suggest that a technology orientation is an important factor that leads to more knowledge-learning behaviors

Organizational learning as a process includes information acquisition, information dissemination, shared interpretation, and organizational memory (Sinkula 1994, Slater and Narver 1995) Information, which can be acquired through the market, direct experience, or the experiences of others, is a pivotal aspect of innovation development because firms cannot generate insights for breakthroughs without it (Sinkula, Baker, and Noordewier 1997) Effective information dissemination further increases the value of information When different organizational units view the information from various angles, they respond with feedback that often provides new insights into the process of new product development (Slater and Narver 1995) However, before an organization can use the information, it must interpret the information to determine its meaning and implications, and it must reach a consensus (Day 1994) At this stage, a relatively high level of disagreement is actually beneficial for generating truly insightful knowledge, but there must still be effective conflict resolution to reach consensus in a timely manner (Slater and Narver 1995) Finally, organizational memory, or the ability to store and access prior lessons, enables a firm to maintain a steady pace of long-term learning (Sinkula 1994) Because of its inherent flexibility, a learning organization can reconfigure its structure and reallocate its resources to foster breakthroughs, including those for emerging markets (Slater and Narver 1995) Therefore, we hypothesize the following

H_4 Organizational learning mediates the relationships between strategic orientations and breakthrough innovations

Market Force and Breakthrough Innovation

The competitive-force perspective argues that competitive advantage lies in a firm's correct positioning in a market (Porter 1985) The sustainability of the competitive advantage that stems from such a position critically depends on the relative influence of the market forces that the firm encounters (Porter 1980) In line with the work of Voss and Voss (2000), we break market forces down into three categories demand (e g , demand uncertainty, market growth), competition (e g , competitive intensity, hostility), and supply (e g , technological turbulence, supply power) characteristics Of these, demand uncertainty, technological turbulence, and competitive intensity are the three most fundamental characteristics because they represent the influences of customers, technology, and competition in the market (Li and Calantone 1998). Although research has noted their potential impact on product innovation, formal conceptualizations and empirical validations are scarce (Ali 1994; Gatignon and Xuereb 1997). We attempt to extend the existing research by examining how these market forces drive breakthrough innovations.

Demand uncertainty. Demand uncertainty refers to the instability of consumer preferences and expectations. In a stable market in which consumer preferences remain unchanged, there is no need for firms to modify their products drastically to satisfy customers. As a result, incremental but not breakthrough innovations are likely to occur because introducing breakthrough innovations is risky and requires substantial resources (Ali 1994; Sorescu, Chandy, and Prabhu 2003). However, if consumer preferences are unstable and change quickly, identification of consumers' changing needs becomes increasingly difficult, and incremental innovations are unlikely to satisfy them (Wind and Mahajan 1997). In such a market, companies could turn to breakthrough innovations to provide offerings that precede customer needs and create customer demand by reshaping the way customers behave (Hamel and Prahalad 1994; Porter 1985). Because consumer preferences are difficult to predict, the external guidelines by which firms judge whether a tech- or a market-based innovation is more promising are blurred. Thus, firms value both types of innovations. Therefore, we hypothesize the following:

H_5: Demand uncertainty has a positive effect on both tech- and market-based innovations.

Technological turbulence. Technological turbulence refers to the rate of technological advances within an industry. In an industry in which technology is undergoing rapid change, firms must promote more breakthroughs. Fast technological advances significantly shorten the life cycle of existing products, erode the competitive advantage of even well-entrenched firms, and propel other firms to the forefront (Porter 1985; Tushman and Anderson 1986). Firms must enhance their R&D strength and seize the opportunities that new technologies create to advance next-generation products; otherwise, they will be squeezed from the market (Li and Calantone 1998). Furthermore, fast-changing technologies make breakthrough innovations more possible by changing the way the existing value chain works. For example, technological development may "raise or lower scale economies, make interrelationships possible where they were not before, create the opportunity for advantages in timing, and influence nearly any of the other drivers of cost or uniqueness" (Porter 1985, p. 171). In such conditions, firms can take advantage of technological advances to alter components of the existing value chain significantly. As a result, both tech- and market-based innovations are likely to occur.

H_6: Technological turbulence has a positive effect on both tech- and market-based innovations.

Competitive intensity. Competitive intensity refers to the degree of competition that a firm faces within its industry. Intense competition is characterized by severe price wars, heavy advertising, diverse product alternatives, and added services (Porter 1980). In such conditions, two options are especially desirable. First, firms can internalize their competitors' strength simply through imitation. Porter (1985) suggests that in a highly competitive market, companies should pay special attention to costs because of the greater pressure that price wars cause. Thus, imitation becomes an obvious choice to reduce the high cost of product innovation (Day and Wensley 1988). Accordingly, firms may mimic their competitors' behavior and copy their technologies, thereby leading to fewer tech-based innovations.

Second, firms can nullify their competitors' strength by identifying a new segment and serving new customers who have a different value system (Porter 1985). Instead of competing head-to-head with their rivals by imitating or introducing more advanced products for the existing market (i.e., tech-based innovations), firms can introduce market-based innovations that target a new, unserved market (Porter 1985). Some of these market-based innovations may have the potential to outperform technological advances in the existing market in the future and thus may succeed in invading the existing market and replacing existing products. In other words, competitive intensity is conducive to market-based innovations. Therefore,

H_7: Competitive intensity has (a) a negative effect on tech-based innovations and (b) a positive effect on market-based innovations.

Breakthrough Innovation and Performance

Empirical assessments of the performance impact of breakthrough innovations are limited, partly because innovation is portrayed as a "universally useful and productive end in and of itself" (Drazin and Schoonhoven 1996, p. 1067; Sorescu, Chandy, and Prabhu 2003). In response, we explore the performance outcomes of tech- and market-based innovations.

Unlike incremental innovations, breakthroughs have the potential to create markets, shape consumers' preferences, and change consumers' basic behavior; sometimes the changes are so fundamental that soon after they are implemented, people cannot imagine living any other way (Hamel and Prahalad 1994). Thus, breakthrough innovations can contribute significantly to profitability (Wind and Mahajan 1997). Hamel and Prahalad (1994) also argue that the introduction of breakthrough innovations is the key to survival in turbulent environments. In particular, because tech-based innovations provide greater benefits to a firm's mainstream customers and market-based innovations are embraced by new or emerging markets (Benner and Tushman 2003), both should positively affect performance. Thus:

H_8: Both tech- and market-based innovations have a positive effect on performance.

Methodology

Sampling and Data Collection

As does previous research on innovation (e.g., Gatignon and Xuereb 1997), we test our hypotheses by examining brands at the strategic business unit (SBU) level in consumer product categories. We obtained the sample as follows. First, we acquired a sampling frame of 2260 brands of commonly used consumer durable and nondurable products in 48 categories from the Sino-Monitor International Company's (2000) annual China Marketing & Media Study.[1] Second, we used a stratified random sampling to select the brands for the survey. We divided the brands in each product category into two groups on the basis of their market share. The first group included the 10 brands with the highest share, the second group consisted of the rest of the brands. We selected at least 3 brands at random from each brand group in each product category, for a total of 150 and 250 brands from the first and second groups, respectively. Third, for each brand in the sample, we called the company to identify a senior manager (e.g., marketing director, general manager, regional brand manager) as the key informant. We further screened the key informant to ensure that he or she possessed well-rounded knowledge about the brand's various functional areas and was committed to cooperating with the research project.[2] Each respondent reported in reference to a single brand.

Hoskisson and colleagues (2000) suggest that in an emerging economy, collaboration with local researchers is a key means of obtaining reliable and valid information; in addition, face-to-face interviews are desirable because they increase response rates and generate more valid information. For these reasons, we commissioned a national marketing research firm to administer the survey through personal interviews.[3] All respondents were informed in advance of the confidentiality of their responses, and an enclosed official university letter explained the academic purpose of the project to them. Each respondent received a valuable gift and was promised a summary report of the survey. These efforts were highly effective. We obtained a total of 350 completed surveys, 139 from the 150 brands in the first brand group (92.7%) and 211 from the 250 brands in the second brand group (84.4%). Of the participating brands, 61.1% were domestic brands, and 38.9% were foreign brands. Product categories included appliances (23.4%), beverages (13.4%), snacks (10.6%), cosmetics (10.3%), clothes and shoes (10%), cigarettes and liquors (7.1%), cleaning products (6.9%), automobiles (4%), PCs (3.7%), and others (10.6%).

Tech- and Market-Based Innovations in the Chinese Market

We chose the Chinese market because, with its prevalence of tech- and market-based innovations, it offers an appropriate context to test our model. On the firm or supply side, companies are introducing more and more new products into the market as product innovation becomes increasingly important for business success (Finance Channel 2003; Wong and Maher 1997). As China moves toward a market economy, foreign firms have rushed into the market, many with more advanced or newer technologies. To survive the competition, local firms are updating their technologies through internal R&D, knowledge transfer in joint ventures, and/or direct imports from developed countries. To sustain their competitive advantage, foreign firms must not only exploit their existing capabilities but also develop new ones specifically for the Chinese market. For example, General Motors has invested more than $1 billion since 1994 in its Volvo project in China, focusing on the design, development, and production of a Chinese version that is "completely adapted to local buyers" (Luo 2002, p. 60). In 2003, Ford also announced a $1 billion investment to develop new Focus models for the Chinese market (BBC News 2003).

On the consumer or demand side, Chinese consumers perceive many new products as breakthrough innovations for two reasons. First, Chinese consumers have limited exposure to and knowledge of Western products (Zhou, Su, and Bao 2002).[4] Thus, Chinese consumers may perceive many products that are developed for the West as new when the products are initially introduced into the Chinese market. Second, both local and foreign companies that are betting on China's huge market potential are constantly introducing many truly breakthrough innovations into the market (*China Daily* 2004; Luo 2002).

The various innovative products included in our sample (see Appendix A)[5] also support the use of the Chinese market for our study. For example, Panasonic introduced a tech-based innovation in the color television category that employs some of the most advanced video technologies, such as movement compensation, high-resolution display tube, and gigahertz picture handling. The innovation offers clearer, more continuous, and smoother pictures than do existing products, attributes that mainstream television buyers value. Similarly, Shinco's air conditioner adopts several leading technologies, including "oxygen bar" technology, a high-efficiency air filter, and a negative ion generator. Such advanced technologies help provide an oxygen-enriched, healthier indoor environment and improved allergen and bacteria control, and mainstream consumers have welcomed these benefits.

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[1] One of the largest surveys of its type conducted in China, the China Marketing & Media Study sample consists of 50,000 residents aged 15–64 years. The sample includes residents of 20 major cities in China: Beijing, Shanghai, Guangzhou, Chengdu, Tianjin, Jinan, Zhengzhou, Nanjing, Xian, Shengyang, Haerbin, Kunming, Fuzhou, Xiamen, Chongqing, Shenzhen, Qingdao, Hangzhou, Wuhan, and Dalian. Respondents are sampled in urban and suburban areas of the 20 cities through a stratified random sampling method according to population density.

[2] The screening questions included whether the respondent was responsible for formulating the brand's marketing and sales strategy plan, implementing the brand's marketing plan, managing the sales of the brand, and planning the brand's image.

[3] The firm's headquarters are in Beijing, and it has branches and affiliates across China. It has long-standing multinational clients, such as AT&T and Procter & Gamble, that have awarded the firm quality-service certificates for its marketing research services.

[4] According to a survey that the Horizon Group (1998) conducted of 5764 consumers in 11 major cities in China, consumers' knowledge and understanding of Western products is limited; they scored only 2 on a scale for which 4 was the highest possible score.

[5] Because of length constraints, Appendix A presents only a few examples of the tech- and market-based innovations in our sample. A table with more examples is available on request.

The Royal Jelly brand of chocolate is an example of market-based innovation. It employs a different technology to preserve the efficacy of royal jelly when it is added to chocolate. The benefit of royal jelly (building up the human immune system) appeals to health-conscious customers but not to mainstream consumers (mostly young people, who focus on the taste and enjoyment benefits of chocolate). Another example is the Langchao brand of laptop computers, which employs a sturdy design and associated technologies that focus exclusively on protecting the laptop against damage, shock, water, dust, and even electromagnetic radiation. These benefits are targeted at a new segment of consumers who use their laptops in harsh and hazardous conditions.

Measures

All the measures were professionally translated with back translation to ensure conceptual equivalence (Hoskisson et al. 2000). The questionnaire items were pretested on a sample of ten senior managers. On the basis of their responses, we revised a small number of questionnaire items to enhance the clarity. Unless specifically indicated, we measured all the items using a seven-point Likert scale (1 = "strongly disagree," 7 = "strongly agree") (see Appendix B).

Strategic orientation. We adopted Narver and Slater's (1990) scale to measure market orientation, and we treated it as a second-order factor with three first-order indicators: customer orientation, competitor orientation, and interfunctional coordination. We adapted the measure of technology orientation from the work of Gatignon and Xuereb (1997) and Hurley and Hult (1998), with items assessing a firm's proactivity in using state-of-the-art technologies in new product development. We developed the measure of entrepreneurial orientation on the basis of Naman and Slevin's (1993) and Hult and Ketchen's (2001) work. The items emphasize a firm's proactivity in preparing for change because China has been experiencing extensive changes during its transition to a market economy.

Organizational learning. Consistent with previous conceptual (e.g., Day 1994; Slater and Narver 1995) and empirical (Sinkula 1994; Sinkula, Baker, and Noordewier 1997) studies, we operationalized organizational learning as a second-order factor that consists of four first-order indicators: information acquisition, dissemination, shared interpretation, and organizational memory. We assessed information acquisition as the extent to which an organization learns from various sources, information dissemination as the degree to which an organization shares learned knowledge (Sinkula, Baker, and Noordewier 1997), shared interpretation as team decision making and conflict resolution (Slater and Narver 1995, p. 65), and organizational memory as the amount of knowledge and experience an organization has in new product development (Moorman and Miner 1997).

Breakthrough innovation. We adapted the measure of tech-based innovation from Gatignon and Xuereb's (1997) work. It captures the degree of technological advances and improved benefits over existing products; this is also consistent with Chandy and Tellis's (2000) measure of radicalness, which has two items that assess the degree of technological advances and benefit improvement. However, our informants (i.e., managers) differ from those in Chandy and Tellis's study (i.e., three expert raters).

We developed the measure of market-based innovation on the basis of Benner and Tushman's (2003) and Christensen and Bower's (1996) conceptualizations. They emphasize that such innovation is characterized not by its technological difficulty but rather by its difficulty in evaluation and the lack of ready acceptance by mainstream customers (see also Adner 2002). Thus, we adapted four items from Eliashberg and Robertson's (1988) work to capture the characteristics of market-based innovation from the customer's viewpoint: (1) difficulty in evaluating the product concept, (2) higher switching cost, (3) extra effort needed to learn the new product, and (4) additional time required to understand the product's full benefits.

To examine the validity of our innovation measures across different methods, we collected relevant brand information from secondary sources and asked two trained judges (Chinese consumers) to classify the brands in our sample according to the definitions of innovations (i.e., newness of the technology and the consumer benefit) because consumers are the ultimate judges of innovativeness (Im and Workman 2004). The judges' classification results are consistent with managers' ratings of tech- and market-based innovations. This supports the convergent validity of the measures and suggests that managers' responses can represent customers' perceptions. A summary of the judging exercise and its results appears in Appendix C.

Market force. We measured both demand uncertainty and competitive intensity with a two-item scale that we adapted from Jaworski and Kohli's (1993) work. Also on the basis of Jaworski and Kohli's (1993) work, we developed a scale of technological turbulence specifically for this study to capture the characteristics of the technological environment in China.

Performance. As has been done in previous studies (e.g., Slater and Narver 1994), we included two types of indicators: firm (i.e., SBU) performance and product performance. We measured firm (SBU) performance by asking respondents to assess their firm's sales growth, return on investment, and profit level relative to that of their major competitors (1 = "much worse," 7 = "much better"). We measured product performance by assessing the product quality and value to customers relative to competing products (adapted from Gatignon and Xuereb 1997). We used relative measures because they are not subject to product category- or industry-specific effects.

Construct validity. We refined the measures and assessed their construct validity as follows: First, we ran exploratory factor analyses for each set of focal constructs (i.e., strategic orientations, organizational learning, innovations, market forces, and performance), which resulted in factor solutions as theoretically expected. Second, we ran confirmatory factor analyses for each set of focal constructs. After we dropped some items that possessed either low factor loadings or high cross-loadings, the confirmatory models fit the data satisfactorily (see Appendix B).

Furthermore, we assessed the convergent and discriminant validity of the focal constructs by estimating an 11-factor confirmatory measurement model. All 11 constructs were latent variables. Each questionnaire item loaded only on its latent construct (or first-order factor). We allowed the latent constructs to be correlated, whereas we constrained the measurement items and their error items to be uncorrelated. The model provides a satisfactory fit to the data ($\chi^2[505] = 1202.90, p < .001$, goodness-of-fit index [GFI] = .87, confirmatory fit index [CFI] = .89, incremental fit index [IFI] = .89, and root mean square error of approximation [RMSEA] = .06), indicating the unidimensionality of the measures (Anderson and Gerbing 1988). Furthermore, all factor loadings were highly significant ($p < .001$), and the composite reliabilities of all constructs exceeded the usual .60 benchmark (Bagozzi and Yi 1988). Thus, the measures demonstrate adequate convergent validity and reliability.

We assessed the discriminant validity of the measures in two ways. First, we ran chi-square difference tests for all the constructs in pairs (55 tests) to determine whether the restricted model (correlation fixed as 1) was significantly worse than the freely estimated model (correlation estimated freely). All chi-square differences were highly significant (e.g., the test for product performance and firm performance $\Delta\chi^2[1] = 15.24$, $p < .001$), providing evidence of discriminant validity (Anderson and Gerbing 1988). Second, we calculated the shared variance between all possible pairs of constructs to determine whether they were lower than the average variance extracted for the individual constructs. The results show that for each construct, the average variance extracted was much higher than its highest shared variance with other constructs, providing additional support for the discriminant validity (see Appendix B) (Fornell and Larker 1981). Overall, the results show that the measures in our study possess adequate reliability and validity.

Control variables. To account for the effects of extraneous variables, we included firm size, incumbency, product category, and entry barrier as control variables. The importance of firm size and incumbency in innovation research has been well documented (Chandy and Tellis 1998, 2000). We used the logarithm of the number of an SBU's employees as an indicator of firm size. Following Ali's (1994) work, we deemed incumbency as the firm's relative position in the market (i.e., market share) and measured it as a dummy variable (1 = "brands with a higher market share," 0 = "brands with a lower market share"). We included product category as a dummy variable to control for potential variations between "durable" (coded as 1) and "nondurable" (coded as 0) products. Finally, we controlled for entry barrier because of its influence on performance (Jaworski and Kohli 1993; Slater and Narver 1994). We measured it by asking respondents to indicate the degree to which "in the industry where our brand operates, it is difficult to enter the markets far away from our home-base city" (1 = "strongly disagree," 7 = "strongly agree"). We present the basic descriptive statistics and correlations of the measures in Table 1.

Analysis

To test the hypotheses, we employed structural equation modeling with the maximum likelihood estimation method, using the model illustrated in Figure 1 as the base model. Because of the complexity of our model, we treated the two second-order factors (i.e., market orientation and organizational learning) as two latent factors with summated first-order indicators. Given the measurement validity of the overall market orientation and organizational learning scales, this technique could reduce model complexity and be used for structural model analysis and hypotheses testing (Anderson and Gerbing 1988; Matsuno, Mentzer, and Ozsomer 2002). To test the mediating role of organizational learning, we followed Baron and Kenny's (1986) procedures and estimated two models: Model 1 without organizational learning and Model 2 with organizational learning as the intermediate variable (i.e., the model in Figure 1). In Model 2, we also linked market forces to organizational learning to explore whether their relationships are significant (see Slater and Narver 1995). In addition, we included the four control variables in the models and linked them directly to innovation and performance. Both models fit the data adequately, and the results appear in Tables 2 and 3, respectively.

Results

As Table 2 shows, market orientation has a positive effect on tech-based innovation ($\beta = .095, p < .05$) and a negative impact on market-based innovation ($\beta = -.175, p < .001$), in support of H_{1a} and H_{1b}. Technology orientation is positively associated with tech-based innovation ($\beta = .250, p < .001$) but is not related to market-based innovation ($\beta = .070, p > .10$), in support of H_2. Entrepreneurial orientation positively affects both tech-based ($\beta = .339, p < .001$) and market-based ($\beta = .179, p < .001$) innovation, in support of H_3.

H_4 tests the mediating role of organizational learning. According to Baron and Kenny (1986), when the mediator (organizational learning) enters the model, the contribution of a previously significant independent variable (in Model 1) should drop significantly (in Model 2) for partial mediation and become insignificant for full mediation. Therefore, the results in both Tables 2 and 3 are needed to assess H_4. Table 3 shows that all three types of strategic orientation significantly affect organizational learning (all $p < .01$) and that learning positively affects tech-based innovation ($p < .01$) but not market-based innovation ($p > .10$); thus, learning is not a mediator between market orientation and market-based innovation. A comparison of Tables 2 and 3 reveals that organizational learning fully mediates the relationships between market orientation and tech-based innovation and partially mediates the relationships between technology or entrepreneurial orientation and tech-based innovation. Thus, H_4 receives mixed support.

As both Tables 2 and 3 show, demand uncertainty positively affects both tech-based ($p < .05$) and market-based ($p < .001$) innovations, in support of H_5. Technological turbulence is positively related to tech-based innovation ($p < .001$) but has no relationship with market-based innovation ($p > .10$); thus, H_6 is partially supported. The relationship

TABLE 1
Basic Descriptive Statistics of the Constructs

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Firm (SBU) performance	1 00														
2 Product performance	51**	1 00													
3 Tech-based innovation	31**	31**	1 00												
4 Market-based innovation	12*	11*	15**	1 00											
5 Market orientation	07	20**	31**	– 11*	1 00										
6 Technology orientation	10*	21**	43**	08	50**	1 00									
7 Entrepreneurial orientation	44**	38**	45**	14**	26**	28**	1 00								
8 Organizational learning	31**	33**	37**	02	44**	39**	46**	1 00							
9 Demand uncertainty	– 08	– 05	10*	40**	– 10	04	07	– 01	1 00						
10 Technology turbulence	02	07	30**	12*	19**	32**	07	18**	13*	1 00					
11 Competitive intensity	– 30**	– 19**	– 08	31**	– 06	00	– 19**	– 10	48**	03	1 00				
12 Firm size	25**	14*	07	– 02	– 01	– 01	14**	11*	– 18*	04	– 16**	1 00			
13 Incumbency	26**	21**	06	06	03	09	20**	07	– 12*	– 05	– 12*	36**	1 00		
14 Product category	02	12*	11*	11*	06	07	08	02	05	14**	– 02	23**	05	1 00	
15 Entry barrier	– 22**	– 16**	– 03	11*	– 03	– 04	– 20**	– 08	23**	12*	22**	– 12*	– 20**	– 16**	1 00
Mean	4 25	4 93	5 20	3 05	5 91	5 15	5 06	5 43	3 71	5 55	4 23	4 80	38	35	4 50
Standard deviation	1 35	97	1 13	1 24	64	98	1 02	78	1 40	92	1 46	1 64	49	48	1 64

*$p <$ 05 (two–tailed)
**$p <$ 01

TABLE 2
Standardized Structural Equation Parameter Estimates (t-Value): Model 1 (Organizational Learning Excluded)

Endogenous Variables	Tech-Based Innovation	Market-Based Innovation	Firm Performance	Product Performance
Independent Variables				
Market orientation	095* (1 859)	– 175*** (–3 169)	—	—
Technology orientation	250*** (4 717)	070 (1 229)	—	—
Entrepreneurial orientation	339*** (6 909)	179*** (3 380)	—	—
Demand uncertainty	082* (1 753)	240*** (4 205)	—	—
Technological turbulence	163*** (3 470)	065 (1 287)	—	—
Competitive intensity	– 063 (–1 221)	216*** (3 906)	—	—
Tech-based innovation	—	—	261*** (4 900)	351*** (5 256)
Market-based innovation	—	—	082* (1 731)	088* (1 816)
Controls				
Firm size	033 (686)	– 022 (– 417)	196*** (3 476)	041 (607)
Incumbency	– 031 (– 649)	096 (1 860)	142** (2 582)	195** (2 838)
Product category	027 (586)	094 (1 904)	– 101 (–1 916)	– 065 (–1 010)
Entry barrier	023 (479)	065 (1 286)	– 185*** (–3 456)	– 149* (–2 290)
R^2	350	245	210	240

Goodness-of-fit $\chi^2(485)$ = 1083 01, $p <$ 001, GFI = 87, CFI = 89, IFI = 89, RMSEA = 059

*$p <$ 05
**$p <$ 01
***$p <$ 001
Notes t-tests are one-tailed for hypothesized effects and two-tailed for controls

between competitive intensity and tech-based innovation is negative (β = – 063, – 062) but not significant ($p >$ 10) Furthermore, competitive intensity positively influences market-based innovation ($p <$ 001), in partial support of H_7[6] In addition, because market forces have no direct impact on learning (see Table 3), learning does not mediate the relationships between market forces and innovations

Consistent with our predictions in H_8, the results show that both tech- and market-based innovations positively affect firm and product performance (Tables 2 and 3) To test which type of innovation has a stronger impact on performance, we conducted a chi-square difference test to compare an unconstrained model that freely estimates all the coefficients with a constrained model in which the coefficients associated with tech- and market-based innovations are fixed as equal for each performance indicator, using Model 2 as the baseline model The results of model comparisons show that tech-based innovation has a stronger effect than market-based innovation on both firm ($\Delta\chi^2[1]$ = 6 36, $p <$ 01) and product ($\Delta\chi^2[1]$ = 10 63, $p <$ 001) performance[7]

In addition, as Table 3 shows, large SBUs tend to perform better than small SBUs Incumbents appear to be superior in both firm and product performance Furthermore, entry barriers negatively affect both performance indicators We also performed a series of *post hoc* analyses, and we report the results subsequently

Similar to our test of H_4, we examined the mediating role of breakthrough innovations in the organizational learning–performance relationship In the model without innovations, organizational learning positively affects both firm (β = 176, $p <$ 001) and product (β = 230, $p <$ 001) performance After innovations enter the model, the effects of learning on firm (β = 161, $p <$ 01) and product (β = 217, $p <$ 001) performance become weaker Thus, breakthrough innovations seem to mediate the relationships between learning and performance partially

We also explored the interaction effects between innovations and market forces on performance, using Ping's (1995) technique The results show that none of the interaction terms is significant for firm performance and that two are marginally significant for product performance Tech-based innovation is more effective in improving product performance when demand is highly uncertain (β = 095, $p <$ 10), and market-based innovation is more effective when competition is highly intensive (β = 11, $p <$ 10)

We also tested the interaction effects between strategic orientations and market forces on innovations The results show that only one of nine interaction terms is significant for tech-based innovation Technology orientation has a weaker impact on tech-based innovation when technology is more turbulent (β = – 125, $p <$ 05) Three of nine interaction terms are significant for market-based innovation When demand is highly uncertain, market orientation has a more negative effect (β = – 138, $p <$ 05) and technology orientation has a more positive effect (β = 170, $p <$ 01) on

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[6] To explore the interaction effects of technology turbulence and competitive intensity on innovations, we ran another model in which we added an interaction term into Model 2, using Ping's (1995) technique The results show that the interaction term has no impact on either tech-based (β = 010, p = 825) or market-based (β = 045, p = 334) innovations

[7] We also tested the interaction effects of tech- and market-based innovations on performance The results show that the interaction term is not related to either firm (β = – 003, p = 946) or product (β = 021, p = 737) performance

TABLE 3

Standardized Structural Equation Parameter Estimates (t-Value): Model 2 (Organizational Learning Included)

Endogenous Variables	Organizational Learning	Tech-Based Innovation	Market-Based Innovation	Firm Performance	Product Performance
Independent Variables					
Market orientation	272*** (5 333)	052 (989)	– 177*** (–3 084)	—	—
Technology orientation	130** (2 470)	238*** (4 473)	069 (1 200)	—	—
Entrepreneurial orientation	352*** (7 435)	310*** (5 917)	176*** (3 109)	—	—
Organizational learning	—	134** (2 521)	007 (127)	—	—
Demand uncertainty	– 024 (– 469)	083* (1 780)	240*** (4 206)	—	—
Technological turbulence	071 (1 534)	158*** (3 360)	065 (1 274)	—	—
Competitive intensity	– 003 (– 054)	– 062 (–1 219)	216*** (3 907)	—	—
Tech-based innovation	—	—	—	260*** (4 897)	351*** (5 254)
Market-based innovation	—	—	—	082* (1 731)	088* (1 816)
Controls					
Firm size	—	025 (509)	– 023 (– 432)	196*** (3 477)	041 (607)
Incumbency	—	– 024 (– 510)	096 (1 872)	142** (2 581)	195** (2 838)
Product category	—	032 (708)	094 (1 914)	– 101 (–1 915)	– 065 (–1 010)
Entry barrier	—	021 (448)	065 (1 283)	– 184*** (–3 456)	– 149* (–2 290)
R^2	347	354	245	209	240

Goodness-of-fit $\chi^2(622) = 1422\ 28$, $p <\ 001$, GFI = 86, CFI = 88, IFI = 88, RMSEA = 060

*$p <\ 05$
**$p <\ 01$
***$p <\ 001$
Notes t-tests are one-tailed for hypothesized effects and two-tailed for controls

market-based innovation In addition, entrepreneurial orientation has a more positive impact on market-based innovation when competition is intense ($\beta = 110, p < 05$)

Discussion

Research Implications

This article provides several important implications to the breakthrough innovation area First, this study examines the relationships between strategic orientations and breakthrough innovations, thereby filling a research gap about how firm resources affect breakthroughs (Chandy and Tellis 1998) We find that a market orientation has a positive impact on tech-based innovation but a negative impact on market-based innovation A technology orientation is positively associated with tech-based innovation but has no effect on market-based innovation It is possible that a technology-oriented firm has less interest in market-based innovations because the innovations may not necessarily involve state-of-the-art technologies An entrepreneurial orientation positively affects both tech- and market-based innovations, which is in line with the work of Hamel and Prahalad (1994), who place a high priority on entrepreneurial foresight in competing in the future, and with the work of Tellis and Golder (2001), who emphasize the role of vision in generating breakthroughs Consistent with the RBV, our findings suggest that strategic orientations are culture-based, firm-specific, complex capabilities that can lead to competitive advantages (Day 1994, Hunt and Morgan 1995)

These findings help resolve the ongoing debate about the effect of market orientation on innovation Contrary to the long-standing concern that market orientation may impede innovations (e g , Bennett and Cooper 1979, Frosch 1996, MacDonald 1995, Meredith 2002), our results indicate that a market orientation facilitates tech-based innovations, which address the needs of mainstream customers These findings support Slater and Narver's (1998, 1999) contention that market orientation is more than just a customer-led concept, rather, it can help identify and fulfill mainstream customers' latent or unmet needs and enable a firm to achieve a competitive advantage and superior performance

However, our findings also reveal a limitation of market orientation, that is, it hinders market-based innovations, which initially address the needs of new and emerging markets A market-oriented firm, with a goal of serving its best customers, is less likely to invest sufficiently in pursuing opportunities in emerging markets (Christensen and Bower 1996, Conner 1999) This result helps explain Voss and Voss's (2000) unexpected finding that a customer orientation negatively influences performance in an artistic environment Taken together, our findings suggest that market orientation is a pivotal resource that affects a firm's strategy and operation, but its potential value should be complemented with other firm capabilities, such as entrepreneurship

Second, whereas extant studies of strategic orientation have focused mainly on the orientation–performance relationship and left the underlying process largely untapped (see Noble, Sinha, and Kumar 2002), we explore the mediating role of organizational learning We find that it acts as a partial mediator between strategic orientations and tech-based innovation This suggests that strategic orientations as firm capabilities do not automatically lead to better performance Instead, they represent deeply rooted values and beliefs that bring about certain behaviors, which in turn affect firm performance

Third, this article adds to the breakthrough innovation literature by examining the effects of different market forces We find market forces to be significant contributors to innovations Demand uncertainty positively affects both tech- and market-based innovations It seems that when consumer preferences change quickly, firms tend to introduce more creative products to lead rather than follow the market Technological turbulence leads to more tech-based innovations but has no impact on market-based innovations This suggests that possessing new technology is not sufficient to develop market-based innovations, a favorable attitude toward change (i e , entrepreneurial orientation) may be the key Competitive intensity facilitates more market-based innovations, signifying that firms tend to explore new markets in intense competitive conditions In summary, these results are consistent with the competitive force perspective and suggest its complementary nature with the RBV in explaining competitive advantage

Fourth, our study represents an initial effort to distinguish empirically between tech- and market-based innovations and to assess their differential effects on performance Both types of innovations are beneficial to performance, but tech-based innovation has a greater impact on performance than does market-based innovation, possibly because the former provides improved benefits for mainstream customers in established markets These findings echo the call for more research to assess the performance effects of different types of innovations (Drazin and Schoonhoven 1996, Sorescu, Chandy, and Prabhu 2003)

Fifth, this study adds to the innovation literature by testing a model with data from companies in an emerging economy Most extant innovation research focuses on firms in developed countries (mostly the United States), calling into question the generalizability of the findings to other economies (Drazin and Schoonhoven 1996) In an emerging economy, such as China, the fast-changing environment poses serious challenges to the theoretical development and strategic choices of firms (Hoskisson et al 2000) Our findings indicate that though the RBV and competitive force perspective originate in developed economies, they appear applicable to emerging economies as well, given that the results support most of our hypothesized effects The results also extend research on emerging economies by showing how firms should strategize during fundamental transitions (Peng 2003)

Managerial Implications

This study provides several managerial implications for firms to facilitate product innovations Firms can foster tech-based innovations by following a market, a technology, or an entrepreneurial orientation Practitioners have recognized the importance of a market orientation in achieving competitive advantage (e g , slogans such as "putting people first" [British Airways] or "have it your way" [Burger King]) Our results reinforce this belief Market-oriented firms are able to identify customers' latent needs and satisfy those needs by offering tech-based innovations However, adopting a market orientation alone hinders the market-based innovations that initially address the needs of new and emerging markets To resolve this issue, firms should couple a market orientation with entrepreneurial values, which encourages frame-breaking actions, enhances truly innovative abilities, and enables firms to escape the myopia of their served markets

When a market becomes highly competitive, it is increasingly difficult for firms to differentiate themselves from their competitors (Gatignon and Xuereb 1997) This study suggests that a focus on market-based innovation is a feasible strategy By targeting new and unserved segments, firms can introduce innovations that seize opportunities in emerging markets

Some anecdotal experiences suggest that in emerging economies, because of consumers' low consumption power and limited product exposure, an imitation strategy with a low price is the key to business success (Kotler 2002) Our findings suggest that an innovation strategy is also a viable option Although consumers in emerging economies may have limited exposure to new technologies, they are eager to learn and try new and innovative products that offer genuine benefits over existing products Thus, introducing creative products to shape rather than respond to consumer preferences may enable a firm to become the dominant player in the market, as demonstrated by the success of innovative firms, such as Haier and Oriental Communication in China (Finance Channel 2003)

Limitations and Further Research

As an initial effort to address a complicated phenomenon, this study is subject to several limitations Insights provided on the breakthrough innovation–performance relationship are limited by the cross-sectional nature of this study As Chandy and Tellis (1998) note, it may take a long time for breakthrough innovation to demonstrate its effects on performance fully A longitudinal study is warranted to examine this issue further

In addition, this study focuses mainly on the link between strategic orientations and breakthrough innovations Additional research should expand our model by considering other important firm resources and capabilities, such as physical assets and learning orientation Furthermore, this study explores only the mediating role of organizational learning However, strategic orientation as culture-level values and norms and organizational learning as a learning process do not automatically lead to superior performance Instead, they accomplish this by guiding actions based on learned information and knowledge Therefore, further research should identify the underlying action components to understand how strategic orientation works In addition, because this is the first study to differentiate between tech- and market-based innovations, the measures need further development We encourage further research to develop a more systematic measure of different types of breakthrough innovations

Moreover, our empirical findings are based on data from China Although China shares many characteristics with other emerging economies and emerging industries in developed economies in terms of technology development, consumer behavior, and market conditions (Hoskisson et al 2000, Peng 2003), it also possesses some idiosyncrasies This may limit the generalizability of our findings Therefore, further research should corroborate our strategic orientation–breakthrough innovation study in other developing and developed markets In addition, our research context is consumer products The sources of breakthrough innovations may be different for industrial products or in service markets Therefore, additional research using samples from industrial or service markets is needed to ascertain the generalizability of our findings

APPENDIX A
Exemplar Brands of Tech- and Market-Based Innovations

Tech-Based Innovations	Market-Based Innovations
***Air conditioning*: Shinco 新科** Used the world's leading technologies, such as "oxygen bar" technology (increases indoor oxygen content from 21% to 30% by forcing outdoor air through an oxygen-enriching membrane), high-efficiency air filter, negative ion generator, and auto opening/closing of air-intake door The oxygen-enriching function provides a healthier indoor environment, cleaner and more refreshing indoor air, and improved allergen and bacteria control	***Battery*: Firebird 火鸟** Imported new battery-manufacturing technology Self-developed and applied latest nanotechnology in battery making This product emphasizes a unique benefit, namely, an extra antileaking feature that differentiates the product from others as being environmentally safe Consumers believe this benefit appeals only to those who are environmentally aware, most customers would consider it unimportant
***Bottled water*: Robust 樂百氏** Used the world's most advanced high-technology reverse osmosis process (every drop of water is passed through 27 rigorous stages) to produce high-quality, pure water that is easily absorbed by body cells	***Beer*: Baisha 白沙** Developed the latest automatic beer production and packing technology Uniquely produced beer without heat treatment to preserve nutrients and freshness This product emphasizes its different feature a 24-hour expiration and freshness guarantee Consumers believe it is difficult to control the freshness when the beer expires in one day Some are concerned about the inconvenience of not being able to keep a stock at home

APPENDIX A
Continued

Tech-Based Innovations	Market-Based Innovations

***Color television*: Panasonic** 松下
Applied the world's most advanced "movement compensation" technology to produce smooth pictures of quick movement and adopted high-resolution display tube and gigahertz picture-handling technology for displaying clearer, continuous, and smoother-changing pictures

***Mobile telephone*. Bird** 波導
Cooperated with French companies in technology exchange Adopted advanced technology from France Applied self-developed and patented high-end, intelligent mobile telephone technology and introduced the preset "information wizard" function for extensive access to information about sports, news, weather, financial, and stock markets

***Refrigerator*: Aucma** 澳柯玛
Used advanced technology and developed super coolant (R134a) from own R&D center Provides continuous control of odor-causing bacteria and other potential contaminants, intelligent, computerized temperature control, and cool-air distribution/circulation across compartments for reducing energy consumption

***Washing machine* Sanyo** 三洋
Adopted the most advanced product and manufacturing technology from Japan, such as artificial intelligence, fuzzy logic control, three-dimensional jet-spray design, and so forth Products provide automatic control of detergent, water level, and washing time based on weight, materials, and other attributes of clothes that are detected by various sensors, which improves cleaning, avoids twisting clothes, and reduces wear and tear, time, energy, and water requirements

***Chocolate*: Royal Jelly** 蜂皇漿
Manufactured using latest foreign-imported chocolate-making technology and uniquely adds royal jelly to chocolate Provides the significant benefit of building up human immune system, differentiated from other brands of chocolate by positioning itself as a healthy chocolate Consumers consider chocolate and royal jelly two incompatible benefit-positioning concepts (enjoyment versus healthy) Some consumers are concerned about the taste of chocolate when it is mixed with royal jelly

***Grape wine* Yeluan** 野峦
Used new wine-making technology and production methods Produces a completely and uniquely different grape wine by adding traditional herbal medicine, Wu Wei Zi, which helps improve heart and lung functions Most consumers will not focus on whether herbal medicine is added Some are concerned about the bitter taste of Wu Wei Zi

***Laptop computer*: Langchao** 浪潮
Developed new technology and employed a sturdy design that focuses exclusively on stronger protection against damage, shock, water, dust, electromagnetic radiation, and so forth Consumers believe that the claimed benefits (ultraprotection) will appeal only to specific segments The extra weight would be considered a disadvantage

***Tea drink*: Topsun** 東盛
Used new foreign production technology and set up own R&D center to develop a cholesterol-controlling tea that helps reduce cholesterol level in the body and encourages weight loss (positioned as a weight-loss product as opposed to a beverage) Consumers find the benefits difficult to believe and to evaluate Some raise concerns about side effects

Notes At the micro level, product innovation is viewed as "new to the firm or new to the firm's customers" (Garcia and Calantone 2002, p 119) Therefore, the examination and interpretation of tech- and market-based innovations, particularly in terms of the "newness" of technology and consumer benefits, should take place from the perspectives of firms and consumers in China because it is still a developing economy

APPENDIX B
Measurement Items and Validity Assessment

		Standardized Factor Loading
Strategic Orientation $\chi^2(203) = 521\ 30$, $p <\ 001$, GFI = 90, CFI = 91, IFI = 91, RMSEA = 07		
Market orientation second-order factor, CR = 82, AVE = 60, HSV = 28		
Customer orientation first-order factor, CR = 73		844
•Customer commitment	502	
•Create customer value	396	
•Understand customer needs	539	
•Customer satisfaction objectives	562	
•Measure customer satisfaction	667	
•After-sales service	656	
Competitor orientation first-order factor, CR = 70		640
•Salespeople share competitor information	664	
•Respond rapidly to competitors' actions	671	
•Top managers discuss competitors' strategies	654	
•Target opportunities for competitor advantage[a]	*	

Appendix B
Continued

		Standardized Factor Loading
Interfunctional coordination first-order factor, CR = 87		820
•Interfunctional customer calls	680	
•Information shared among functions	813	
•Functional integration in strategy	812	
•All functions contribute to customer value	768	
•Share resources with other business units	704	
Technology orientation CR = 73, AVE = 41, HSV = 28		
•We use sophisticated technologies in our new product development		463
•Our new products always use state-of-the-art technology		552
•Technological innovation based on research results is readily accepted in our organization		784
•Technological innovation is readily accepted in our program/project management		711
Entrepreneurial orientation CR = 81, AVE = 52, HSV = 26		
•We actively build our capacity to react effectively to market changes		615
•We ensure that our advantages can withstand changes in the industry		706
•We actively prepare for the changes brought by China's entry to the World Trade Organization		857
•We are ready to face the challenges brought by the e-commerce trend		695
Market Force $\chi^2(18) = 70\ 45$, $p <$ 001, GFI = 95, CFI = 90, IFI = 90, RMSEA = 09		
Demand uncertainty CR = 74, AVE = 60, HSV = 29		
•It is difficult to understand consumers' expectations of a brand		594
•Consumers always look for novelty, they are never loyal to a single brand		922
Technological turbulence CR = 73, AVE = 41, HSV = 12		
Over the last 5 years, we see that in the industry where our brand operates,		
•The diversity in production technology has dramatically increased		472
•The leading foreign firms have introduced their state-of-the-art products into China at the same time as their home market		547
With China entering the World Trade Organization, the impacts on the industry where our brand operates will include		
•More new product ideas		679
•More state-of-the-art manufacturing methods		809
Competitive intensity CR = 61, AVE = 44, HSV = 29		
•There are too many similar products in the market, it is very difficult to differentiate our brand		710
•This market is too competitive, price wars often occur		611
Learning and Innovation $\chi^2(83) = 207\ 12$, $p <$ 001, GFI = 93, CFI = 95, IFI = 95, RMSEA = 07		
Tech-based innovation CR = 74, AVE = 60, HSV = 25		
•Our product is highly innovative, replacing an inferior alternative		755
•Our product incorporates a radically new technological knowledge		764
•Overall, our product is similar to our main competitors' products (reversed item)		*
•The application of our product is totally different from that of our main competitors' products		*
Market-based innovation CR = 83, AVE = 56, HSV = 26		
•Our product concept is difficult for mainstream customers to evaluate or understand		791
•Our product involves high switching costs for mainstream customers		862
•The use of our product requires a major learning effort by mainstream customers		759
•It takes a long time for mainstream customers to understand our product's full benefits		550
Organizational learning second-order factor CR = 81, AVE = 53, HSV = 26		
Information acquisition first-order factor, CR = 79		825
•We often visit other companies to improve our knowledge of production, marketing, and management	645	
•We often attend all sorts of expert presentations to improve our knowledge of production, marketing, and management	833	
•We often attend training programs to improve our knowledge of production, marketing, and management	750	
Information dissemination first-order factor, CR = 82		927
•We often exchange ideas on learned knowledge to improve our knowledge of production, marketing, and management	802	
•Our employees often share the learned knowledge with top managers	855	
Shared interpretation first-order factor, CR = 88		615
•We encourage teamwork, team decision making, and internal communication	850	
•We are good at resolving conflicts among the staff	919	

Appendix B
Continued

		Standardized Factor Loading
Organizational memory first-order factor, CR = 83		439
•We have extensive knowledge of and experience in developing new products	797	
•We have extensive experience in formulating new production processes	878	
Performance $\chi^2(8)$ = 53 93, $p <$ 001, GFI = 95, CFI = 96, IFI = 96, RMSEA = 09		
Firm (SBU) performance CR = 88, AVE = 64, HSV = 33		
•Sales growth in the past two years		921
•Return on investment		697
•Profit level		620
•Market share		946
Product performance CR = 67, AVE = 47, HSV = 33		
•Product quality		682
•Value to customer (quality/price)		692
Overall Model Fit $\chi^2(505)$ = 1202 90, $p <$ 001, GFI = 87, CFI = 89, IFI = 89, RMSEA = 06		

*We deleted these items from further analysis because of low factor loadings or high cross-loadings
Notes CR = composite reliability, AVE = average variance extracted, and HSV = highest shared variance with other constructs

Appendix C
Classification of Brands by Trained Judges

Collecting Brand Information

We conducted an extensive search of companies' Web sites, public announcements, and news clips in the media for information relevant to the innovation characteristics and technology/consumer benefits dimensions for each brand We also conducted two focus groups (of 18 Chinese consumers) to obtain additional brand information We obtained relevant information on 314 of the 350 brands (89 7%) and used the information in the brand-classification exercise

Classification Procedure

We adopted the three-step procedure for "expert judging" recommended in content-analysis literature (Kassarjian 1977, Kolbe and Burnett 1991, Krippendorff 2004) In the first step, one author and a research assistant developed and pretested the judging instructions and coding schemes (i e , number of classification categories and the corresponding definitions) in an iterative process [8] In the second step, we recruited two graduate students from China who were majoring in nonbusiness fields (geography and anthropology) and trained them as judges of the newness of the technology and the consumer benefit for each brand The judges coded two training samples (each with 35 brands) until the interrater reliability for various indicators reached the 80 cutoff point (Kassarjian 1977, Krippendorff 2004) [9] In the final step, the two judges independently and formally coded the remaining 244 brands A very high level of interrater reliability (90– 99) was reached We deleted five cases from the final classification result because the two judges could not reach an agreement, resulting in a useful sample of 239 brands

Results

Table C1 summarizes the results of the classification exercise Inside each cell are the managerial (standardized mean) ratings for tech- and market-based innovations [10] The managerial rating for tech-based innovation is highest in Group 1, moderate in Group 2, and lowest in Group 3 (all are significantly different from each other at the 05 level) The managerial rating for market-based innovation is highest in Group 2 (significantly higher than in the other two groups), and the ratings in Groups 1 and 3 are not significantly different from each other These results provide support for the convergent validity of the classification of tech- and market-based innovations across the two methods (i e , managerial ratings obtained from the survey and classification by trained judges)

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[8] Details of the judging instructions and coding schemes are available from the authors on request

[9] We calculated and compared several widely used interrater reliability measures, including Cohen's kappa (K_n), Perreault and Leigh's (1989) index of reliability, intraclass correlations, and Krippendorff's (2004) α

[10] Standardized ratings of tech-based and market-based innovations are reported because the means and standard deviations of the two ratings in the overall sample are quite different Means (standard deviations) are 5 20 (1 13) and 3 05 (1 24) for tech- and market-based innovation, respectively

TABLE C1
Results of the Classification Exercise

Newness of Technology	Newness of Consumer Benefits	
	Low to Medium Levels	**High to Very High Levels**
High to very high levels	**Group 1 (N = 142)** Tech-based innovation = 49^{a} Market-based innovation = – 38^{d}	**Group 2 (N = 35)** Tech-based innovation = – 21^{b} Market-based innovation = 1 43^{e}
Low to medium levels	**Group 3 (N = 62)** Tech-based innovation = –1 22^{c} Market-based innovation = – 44^{d}	**Group 4 (N = 0)**

Notes Standardized means of managerial ratings with the same superscript are not significantly different from each other at α = 05

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Matthew L. Meuter, Mary Jo Bitner, Amy L. Ostrom, & Stephen W. Brown

Choosing Among Alternative Service Delivery Modes: An Investigation of Customer Trial of Self-Service Technologies

Electronic commerce is an increasingly popular business model with a wide range of tools available to firms An application that is becoming more common is the use of self-service technologies (SSTs), such as telephone banking, automated hotel checkout, and online investment trading, whereby customers produce services for themselves without assistance from firm employees Widespread introduction of SSTs is apparent across industries, yet relatively little is known about why customers decide to try SSTs and why some SSTs are more widely accepted than others In this research, the authors explore key factors that influence the initial SST trial decision, specifically focusing on actual behavior in situations in which the consumer has a choice among delivery modes The authors show that the consumer readiness variables of role clarity, motivation, and ability are key mediators between established adoption constructs (innovation characteristics and individual differences) and the likelihood of trial

It is widely recognized that the use of information technology has transformed business processes over the past ten years With the explosion of the Internet and other tools, many firms are incorporating technology into their marketing and operations The impact has been especially profound in the services arena, which has traditionally relied on close, personal contact between customers and employees Technology is dramatically changing how services are conceived, developed, and delivered Indeed, not only has technology infiltrated back-office processes, but it has also been established prominently within the firm–customer interface through self-service technologies (SSTs), such as automated teller machines, pay-at-the-pump, automated hotel checkout, telephone banking, and Internet transactions (Meuter et al 2000)

The lure of incorporating technology into the service interaction can be tremendous For example, IBM shifted 99 million service telephone calls to an online service provision, which resulted in cost savings of $2 billion (Burrows 2001) Although the potential financial benefits of successful technology incorporation are enticing, the savings cannot be realized unless customers embrace and use the new technologies For example, McKinsey & Company reports that one firm projected a $40 million savings from moving its billing and service calls to the Web However, it suffered a $16 million loss, partially as a result of lower customer use than was projected Thus, despite the proliferation of SSTs, firms are increasingly aware that there are barriers to customer adoption and substantial implementation obstacles to be overcome

The most prominent obstacle is getting customers to try new SSTs for the first time, which often involves a significant behavior change in which patterns that are ingrained must be altered Not only must customers change their behaviors, but in a self-service situation, they must also become coproducers of the service, with responsibility for delivery of the service and for their own satisfaction (Bendapudi and Leone 2003, Meuter and Bitner 1997) Across industries, firms are trying to develop stronger partnerships with their customers and to help them be better coproducers (Vargo and Lusch 2004)

This article explores the underlying factors that influence customer trial of new SST options and, by extension, trial of innovations that require significant behavior change or coproduction activity We begin by examining the literature on innovation adoption for clues to the causes of customer adoption behavior The traditional view of innovation adoption focuses on demographic characteristics and characteristics of the innovation itself as the primary predictors of adoption (Rogers 1995) A review of the research on consumer use of SSTs reveals a primary focus on individual differences (e g , Parasuraman and Colby 2001) and on attitude models to predict intended behaviors (e g , Curran, Meuter, and Surprenant 2003, Dabholkar and Bagozzi 2002)

We build on this literature by exploring a set of variables labeled "consumer readiness," which are positioned as

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Matthew L Meuter is Professor of Marketing, Department of Finance and Marketing, California State University, Chico (e-mail mmeuter@csuchico edu) Mary Jo Bitner is PETsMART Chair in Services Leadership and Professor of Marketing (e-mail maryjo bitner@asu edu), Amy L Ostrom is Associate Professor of Marketing (e-mail amy ostrom@asu edu), and Stephen W Brown is Edward M Carson Chair of Services Marketing and Professor of Marketing (e-mail stephen brown@asu edu), Department of Marketing, Arizona State University The authors thank the Center for Services Leadership at Arizona State University for its support in securing a research partner for the study The authors extend their gratitude to the sponsoring firm for its involvement in the project and to the three anonymous *JM* reviewers for their insights throughout the review process

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mediators between established adoption variables and trial Consumer readiness encompasses role clarity, motivation (intrinsic and extrinsic), and ability We expect that exploring consumer readiness and its underlying constructs will broaden our understanding of the antecedents of SST trial and provide greater depth of knowledge with respect to why consumers try innovative services Another contribution of this study is to provide marketing managers with a concise and actionable set of factors for directly influencing SST trial behavior The consumer readiness constructs can be actively managed before an SST is introduced as well as after it is fully operational This is important because the innovation characteristics and demographic factors that have been previously shown to influence trial either are not readily manipulated (e g , age, sex) or are easily managed only before the SST is introduced (e g , complexity, trialability)

Next, we develop a conceptual model and hypotheses to predict SST trial behavior Then, we test our hypotheses across two different technologies with actual trial behavior as the dependent variable We include both users and nonusers of the services in the study The underlying theory as well as the practical lessons learned can be extended to other coproduction situations in which consumer readiness for a significant behavior change may be equally important

Conceptual Foundations

Adoption of Innovations

Diffusion and adoption research has a rich history and has been studied in a wide range of fields (for a comprehensive review, see Rogers 1995) Within the adoption literature, several constructs have received widespread attention Perceptions of innovation characteristics (Eastlick 1996, Labay and Kinnear 1981, Rogers 1995, Venkatraman 1991) and individual differences (Dickerson and Gentry 1983, Eastlick 1996, Greco and Fields 1991) have been shown to predict adoption behaviors, such as trial or commitment

Although there is support in the literature for such factors influencing adoption behavior, the results have often been inconclusive or contradictory For example, a study found significant relationships between adoption and the perceived relative advantage, complexity, and compatibility of the innovation (Labay and Kinnear 1981), whereas another study found only relative advantage to be significantly linked to adoption behavior (Venkatraman 1991) However, the contradictory findings within studies are even more troubling In one study, a significant link was found between adoption behavior and relative advantage in two different contexts, however, the relationship was positive in one context and negative in the other (Venkatraman 1991) A meta-analysis exploring the directionality of links between adoption behavior and perceptions of innovation characteristics (with no regard to the magnitude or statistical significance of the findings) found that only three of ten characteristics consistently related to adoption in the same direction (Tornatzky and Klein 1982, p 41) "If it could be demonstrated that a finite number of perceived characteristics seem to be consistently related to innovation adoption across settings and technologies this would serve to focus both policy and research " We begin to address this concern with our mediating variables

In addition, individual differences, such as demographics, have generated largely inconsistent findings For example, although adopters are usually predicted to be younger (Eastlick 1996, Venkatraman 1991), a comprehensive review of the relationship between age and innovation adoption concludes that only half of the 228 studies reviewed showed a significant relationship between age and adoption behavior (Rogers 1995) It is also problematic that of the studies with significant links between age and adoption behavior, some conclude that adopters are younger, and others conclude that adopters are older (Rogers 1995)

It is important to understand why certain innovation characteristics or individual differences vary in direction and significance across different contexts A way to clarify the inconsistencies is through the use of mediating variables that are included specifically to explain relationships between variables To date, the question of why individual differences or innovation characteristics influence adoption behavior has been left largely unexplored The model we develop herein includes key mediators and is designed to explore why the relationships exist

Services and Technology

In response to the increasing role of technology in services, researchers have begun to explore customer perceptions and usage of service delivery technologies For example, a critical incident study describes the key factors that lead to (dis)satisfaction related to customer use of SSTs (Meuter et al 2000) In addition, Parasuraman (2000, p 308) proposes a "technology readiness" construct, which refers to the "propensity to embrace and use new technologies for accomplishing goals in home life and at work " Technology readiness is a generalized individual difference concept that balances contributors (optimism and innovativeness) and inhibitors (discomfort and insecurity) Similarly, some researchers have explored the capacity and willingness of customers as predictors of adoption (Walker et al 2002), and others have investigated customers' attitudes toward the technology as a means to predict behavioral intentions (Curran, Meuter, and Surprenant 2003, Dabholkar and Bagozzi 2002, Plouffe, Vandenbosch, and Hulland 2001) The technology acceptance model posits that ease of use and the perceived usefulness of a new technology influence customers' attitude toward using the technology, which in turn directly influences intentions to use the technology (Adams, Nelson, and Todd 1992, Davis 1989) Furthermore, Taylor and Todd (1995) compare the effectiveness of the technology acceptance model and the theory of planned behavior, both of which focus on behavioral intentions of the user Dabholkar (1994) explores competing models to understand the attitudinal forces that influence the choice between interpersonal and technology-based service experiences

Going beyond the emphasis on attitudes and behavioral intentions in the services technology literature, our study is designed to extend the literature by focusing on actual trial behavior We designed this study to introduce new factors for the prediction of trial of technology and to embed the new factors within well-established innovation and adoption models

Consumer Coproduction

Customer use of a new SST implies coproduction of the service, which frequently requires customers to engage in new behaviors For example, in the grocery industry, customers are increasingly given the option of scanning their own grocery items and paying for and bagging their food without assistance from a sales clerk This option has revolutionized the typical interface between the customer and the service provider as well as the behaviors required of customers in the grocery industry Lovelock and Young (1979) were among the first to discuss customer coproduction and to indicate that customers are important contributors to a firm's productivity (e g , by using automated teller machines or by pumping their own gas) Other researchers describe a shift in which both practitioners and academics recognize that a "separation of production and consumption is not a normative goal, and toward a recognition of the advantages, if not the necessity, of viewing the consumer as a coproducer" (Vargo and Lusch 2004, p 11) Defining the nature of the customer's role requires conducting a "job analysis" of the customer's responsibilities as is traditionally done for a firm's employees (Schneider and Bowen 1995) Therefore, we propose that successful SST coproduction relies on customers knowing what is expected of them (role clarity), being motivated to engage in desired behaviors (motivation), and having the necessary knowledge and skills (ability) to fulfill their responsibilities (Dellande, Gilly, and Graham 2004, Schneider and Bowen 1995)

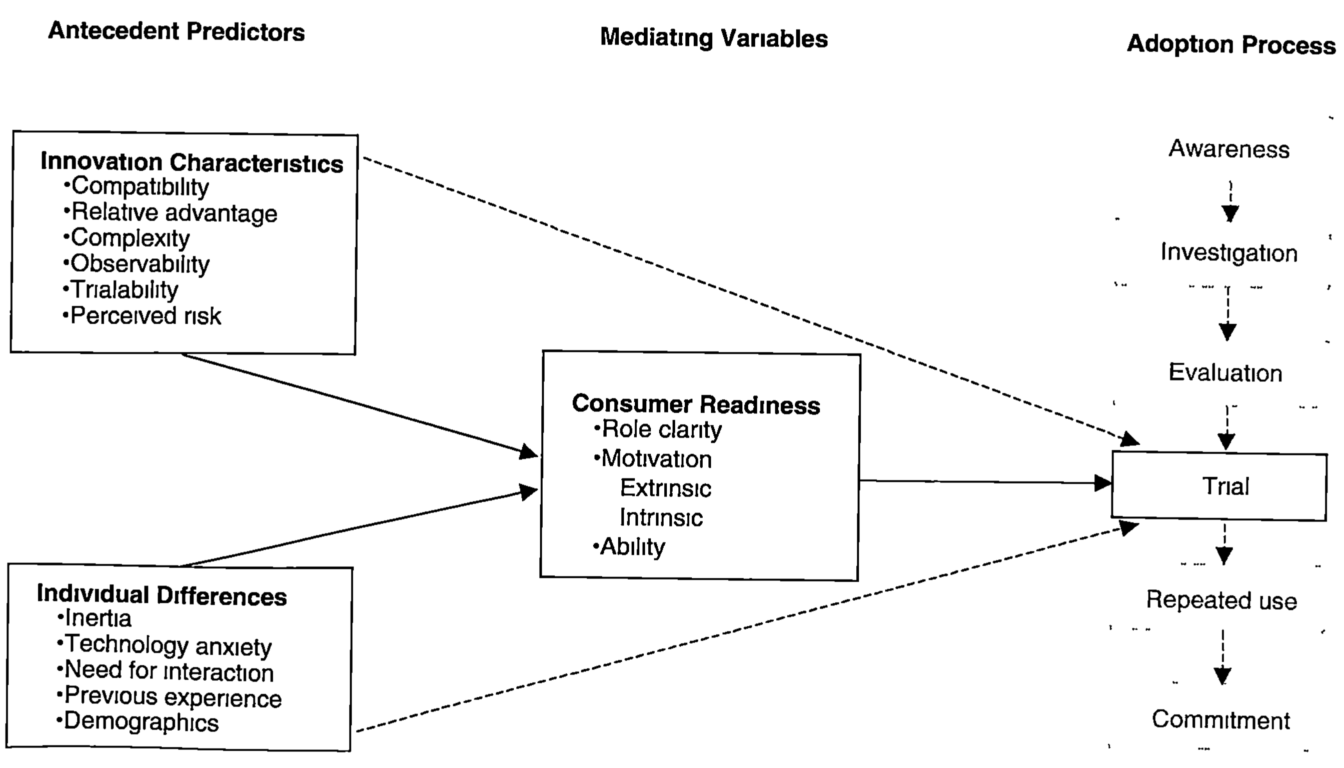
However, a paucity of empirical research exists on customer coproduction (for a recent exception, see Dellande, Gilly, and Graham 2004) A review of the customer-coproduction literature from 1979 to 2000 finds that of the 23 studies, only 3 are empirical (Bendapudi and Leone 2003) Furthermore, no research has examined SST coproduction Our study is designed to build on and extend the three streams of research that we previously reviewed

Conceptual Model and Hypotheses

A wide range of SST options is available, yet most consumers use only a few of them (Barczak, Ellen, and Pilling 1997, p 131) This study investigates the critical factors that influence trial of SSTs in situations in which consumers have a choice among service delivery alternatives We developed the conceptual model (see Figure 1) using both qualitative depth interviews of consumers and insights from related research streams We used the qualitative interviews (n = 22) to focus on variables that are relevant and important to consumers and to ensure that key variables were not overlooked

On the far right-hand side of the conceptual model, we show a traditional six-step adoption process that begins with awareness and leads to commitment to illustrate how our research relates to the process of innovation adoption and commitment (Rogers 1995) However, we focus our empirical research specifically on actual trial behavior as

FIGURE 1
Key Predictors of Consumer Trial of Self-Service Technologies



the focal dependent variable The focus on trial is motivated by companies' experiences, indicating that a key barrier in consumer adoption of new technologies is getting customers to actually try the SST for the first time Consider the airline self–check-in SST as an illustration Such SSTs provide significant time savings for customers, yet many travelers who are unsure of the system or its potential benefits often do not use them Similar outcomes have been observed across industries

In the model, we divide predictors of trial into mediating variables (consumer readiness) and antecedent predictors (innovation characteristics and individual differences) A contribution of the model is the establishment of the set of consumer readiness variables as mediators between the antecedent variables and trial To conclude mediation, several sets of relationships must be present (Baron and Kenny 1986) First, there must be a direct effect of the consumer readiness variables on trial Second, there must be a direct effect of the antecedent predictors on consumer readiness Third, there must be a direct effect of the antecedent predictors on trial that is lessened by inclusion of the consumer readiness variables We discuss the literature and theory that supports each of the requisite sets in the following section

Consumer Readiness Variables as Predictors of Trial

Consumer readiness is a condition or state in which a consumer is prepared and likely to use an innovation for the first time We conceptualize consumer readiness as role clarity, motivation, and ability Role clarity reflects the consumer's knowledge and understanding of what to do, motivation refers to a desire to receive the rewards associated with using the SST, and ability relates to possessing the required skills and confidence to complete the task We adapted the constructs from a framework to improve employees' performance from the human resource and industrial psychology literature streams (Bowen 1986, Schneider and Bowen 1995, Vroom 1964)

Role clarity Because services are traditionally provided by an employee, using an SST requires a set of new coproduction behaviors for the consumer A study found that 89% of firms reported problems of either staff or customer confusion (reduced role clarity) in relation to new services or products (Easingwood 1986) Participation can be constrained by insufficient clarity in terms of a consumer's understanding of his or her role in the service process (Larsson and Bowen 1989) Potential users of an SST who do not understand what to do are unlikely to try the SST Thus, we expect to find a significant, direct relationship between role clarity and trial

Motivation Because consumers may have a choice between interpersonal and SST delivery options, they must be sufficiently motivated to produce a service independently Motivation as a key predictor of usage of technology-based products and services is theoretically well supported in the literature (Barczak, Ellen, and Pilling 1997) The willingness to perform has been shown to be dependent on motivational levels for both employees and customers in the production of services (Larsson and Bowen 1989, Vroom 1964)

We expect both intrinsic and extrinsic rewards to be important in influencing the likelihood of SST trial Some consumers may prefer an active role in the production of a service because they find participation to be intrinsically attractive (Bateson 1985, Dabholkar 1996, Schneider and Bowen 1995) Feelings of accomplishment, prestige, personal growth, or mere pleasure from engaging in the activity are intrinsic motivational factors that are related to the use of SSTs (Becker 1970, Rogers 1995) Consumers are also motivated by their own self-interests, emphasizing the role of extrinsic motivation (Schneider and Bowen 1995) Users have been found to be motivated by a price discount, time savings, or other extrinsic advantages (Dabholkar 1996) Without motivation to perform, it is unlikely that a customer will use an SST Thus, we expect that both intrinsic and extrinsic motivation have a significant, direct effect on trial

Ability Ability relates to having the necessary skills and confidence required to perform a task (Ellen, Bearden, and Sharma 1991, Jayanti and Burns 1998, Jones 1986) Ability refers to what a person "can do" rather than what he or she "wants to do" or "knows how to do" Self-efficacy research has shown that competent behavior in a situation requires both specific skills and beliefs of self-efficacy Low self-efficacy is more likely with complex tasks, but even relatively simple tasks have been shown to create feelings of inability (Ellen, Bearden, and Sharma 1991) It has also been proposed that perceived confidence in the ability to engage in a task influences behavior within computer-mediated environments (Hoffman and Novak 1996) In general, self-efficacy has been shown to be a strong predictor of behavior (Maddux, Norton, and Stoltenbert 1986) When people believe that they are incapable of performing a task, they will not engage in the behavior, even if they acknowledge that it is a better alternative (Seltzer 1983) Thus, we anticipate that there is a significant, positive relationship between ability and trial

Antecedent Variables as Predictors of Consumer Readiness

Another important set of relationships illustrated in the conceptual model is the influence of the antecedent predictors on consumer readiness We explore two sets of antecedent variables innovation characteristics and individual differences To conclude that consumer readiness mediates their effect on trial, there must be a direct relationship between the antecedent predictors and the consumer readiness variables

Innovation characteristics The innovation characteristics that we explore are compatibility, relative advantage, complexity, observability, trialability, and perceived risk They are commonly tested in the adoption literature (Rogers 1995) and thus have well-developed measures from which to draw (Moore and Benbasat 1991) Theoretical and empirical justification for the direct influence of each of the antecedent variables on consumer readiness appears in Table 1 Overall, we expect that relative advantage, observ-

TABLE 1
Previous Research Results Supporting the Effects of Antecedent Predictors on Consumer Readiness and Trial

	Dependent Variable: Consumer Readiness Variables		Dependent Variable: Trial	
Antecedent Predictors	**Justification**	**Supporting Literature**	**Justification**	**Supporting Literature**
Compatibility	Compatibility will increase motivation because the SST will be consistent with values and lifestyle This may also influence the willingness to learn about the SST, thus increasing role clarity	Eastlick (1996), Gatignon and Robertson (1991)	Increased compatibility with personal values and lifestyle increases the odds of a customer trying the SST	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Relative advantage	Relative advantage will encourage customers to learn about the SST, positively influencing both role clarity and ability The advantages also provide a motivational force by providing incentives or perceived rewards	Eastlick (1996), Gatignon and Robertson (1991)	Because the SST is perceived as better than an alternative, it is more likely to be tried	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Complexity	A complicated, confusing SST will hinder role clarity and ability because it will be more difficult to operate and understand and may also make the benefits (motivation) less apparent to the user	Eastlick (1996), Gatignon and Robertson (1991)	If an SST is perceived as more complicated or confusing, a customer will be less likely to try the SST	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Observability	Observability helps clarify the role of the consumer, increase feelings of confidence, and show positive outputs to increase motivation	Eastlick (1996), Gatignon and Robertson (1991)	The ability to observe and communicate with others about the SST increases the chances that it will be tried	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Trialability	Trialability enables users to observe how the SST works, allowing them to recognize the benefits, understand their role, and have confidence in their abilities	Eastlick (1996), Gatignon and Robertson (1991)	The ability to test the SST increases chances that it will be tried	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Perceived risk	As perceived risk increases, the likelihood of rewards decreases, reducing motivation to use an SST and hindering feelings of ability and desire to learn about the SST	Ellen, Bearden, and Sharma (1991)	As perceived risk increases, the likelihood of trial decreases	Aaker (1991), Gwinner, Gremler, and Bitner (1998), Ostlund (1974), Venkatraman (1991)
Inertia	Inertia may limit efforts to learn about SSTs (role clarity and ability) Using a new SST also requires an investment in time and energy, thus reducing motivation	Gremler (1995), Olshavsky and Spreng (1996)	Inertia inhibits changes in behavior and thus results in hesitancy to try new service delivery options	Aaker (1991), Gremler (1995), Heskett, Sasser, and Hart (1990)
Technology anxiety	Technology anxiety may lead to confusion regarding the task to be performed (role clarity), decreased motivation levels, and a reduced perception of ability	Meuter and Bitner (1997), Parasuraman (2000), Raub (1981), Ray and Minch (1990)	High levels of technology anxiety may lead to the avoidance of technological tools, in this case SSTs	Igbaria and Parasuraman (1989), Meuter and Bitner (1997), Parasuraman (2000), Parasuraman and Colby (2001), Raub (1981), Ray and Minch (1990)

TABLE 1
Continued

Antecedent Predictors	Dependent Variable: Consumer Readiness Variables		Dependent Variable: Trial	
	Justification	Supporting Literature	Justification	Supporting Literature
Need for interaction	A high need for personal interaction may lead to decreased interest in learning how SSTs work (role clarity and ability) and reduced motivation to try it	Dabholkar (1996), Langeard et al (1981)	A high level of need for personal interaction decreases the desire to try an SST	Bateson (1985), Dabholkar (2000), Langeard et al (1981), Meuter et al (2000)
Previous experience	The previous use of related technology will increase perceptions of self-confidence and ability and may also allow for the recognition of rewards (motivation) and guide behavior (role clarity)	Bowen (1986), Gardner, Dukes, and Discenza (1993), Mahajan, Muller, and Bass (1990), Mohr and Bitner (1991)	Heavy users of related technologies are more likely to try SSTs	Danko and MacLachlan (1983), Dickerson and Gentry (1983), Eastlick (1996), Gatignon and Robertson (1991), Rogers (1995)
Demographics (age, sex, education, and income)	Higher education may lead to confidence (ability) and the perception of the SST as more understandable (role clarity) and rewarding (motivation) Higher income may increase the chances of access to the required tools (ability) and the motivation (time savings, or other) to use SSTs Age and sex may also have similar effects	Breakwell et al (1986), Gist (1987), Igbaria and Parasuraman (1989)	People who adopt new technologies tend to be younger, male, and more educated and have a greater income than those who do not adopt it	Danko and MacLachlan (1983), Darian (1987), Dickerson and Gentry (1983), Gatignon and Robertson (1991), Greco and Fields (1991), Labay and Kinnear (1981), Rogers (1995), Sim and Koi (2002), Venkatraman (1991), Zeithaml and Gilly (1987)

ability, trialability, and compatibility have a positive effect on the consumer readiness variables We expect that complexity and perceived risk have a negative effect on consumer readiness variables

Individual differences The individual differences that we include are inertia, technology anxiety, need for interaction, previous experience with related SSTs, and demographic characteristics We include demographic characteristics and previous experience because of their pervasive nature in previous adoption studies (Rogers 1995) We include need for interaction, inertia, and technology anxiety because of their presence in recent services technology research (Dabholkar 1996, 2000, Parasuraman 2000) and their relevance to the technology-based service delivery context Theoretical and empirical justification relating each of the individual differences to the consumer readiness variables appears in Table 1 Overall, we expect a positive relationship between previous experience and the consumer readiness variables However, we expect that need for interaction, inertia, and technology anxiety have negative effects on consumer readiness We consider demographic variables such as age, income, education level, and sex We expect that higher-income, highly educated consumers have greater consumer readiness The effects of age and sex are less clear, though there is a belief that younger people and males are more likely to have higher levels of role clarity, motivation, and ability with respect to technology innovations than are older people and females

Antecedent Variables as Predictors of Trial

Without a direct effect of an antecedent predictor on trial, mediation by the consumer readiness variables is not possible Justification for the direct influence of each of the antecedent variables on trial appears in Table 1 Because the variables have been tested in prior studies (albeit with mixed results), we do not discuss the relationships at length here We expect that relative advantage, observability, trialability, and compatibility are positively related to trial, whereas complexity and perceived risk have a negative effect on trial Consistent with previous research, we expect that inertia, technology anxiety, and need for interaction have a negative effect on trial, whereas previous experience with related technologies has a positive effect on trial We also expect that consumers who are more educated, have a higher income, are younger, and are male are more likely to try the SST

Overall Mediation Hypotheses

As we conceptualize in Figure 1 and have developed in the previous discussion of important relationships, the model indicates that consumer readiness variables mediate the relationships among the innovation characteristics, individual differences, and the likelihood of trial That is, we believe that the consumer readiness variables provide a concise set of variables that can explain why the direct effects of the antecedent predictors occur and why we may observe inconsistent directionality and magnitude of effects for the antecedent predictor variables On the basis of the conceptualization of the model, the literature we reviewed, and the previous discussion, we propose the following mediating hypothesis

H_1 Role clarity, extrinsic motivation, intrinsic motivation, and ability mediate the relationship (a) between the individual difference variables and the likelihood of trial and (b) between the innovation characteristic variables and the likelihood of trial

Explanatory Power of Consumer Readiness Versus Antecedent Predictors

In addition to the mediating effects of the consumer readiness variables, it is important to explore the relative strength of the various sets of predictors of trial Although we propose the consumer readiness variables as mediators, it is also important to know whether the variables are more effective than traditional antecedents in the direct prediction of trial We expect that the small set of consumer readiness variables may be more stable across contexts, because previous research shows that these factors consistently drive human behavior (Bowen 1986, Schneider and Bowen 1995, Vroom 1964) A key value of the constructs is to provide managers with a consistent and concise set of actionable variables that influence trial It is our belief that, overall, the consumer readiness variables are more robust predictors Thus, we provide the following hypothesis

H_2 The consumer readiness variables are better predictors of trial than are the innovation characteristic or individual difference variables

Methodology, Procedure, and Analysis

To test the conceptual model empirically, we conducted two studies, each of which focused on a new SST The replication across two SSTs provides a strong test of the model and hypotheses

Context

We selected a context with three traits First, it was important to allow consumers to have a choice between the SST and non-technology-based delivery options Second, it was necessary to identify a group of consumers that had used the SST and a group that had never tried it Third, it was important for the SST to be a newly implemented delivery option to maintain recency in the consumer decision of whether to try the SST A national company that satisfies the three criteria was selected as a partner The context is consumers' prescription refill ordering through a mail-order pharmacy Customers typically order a three-month supply of their prescription medication (insurance industry restrictions allow orders only every 90 days) All respondents are customers who have ordered a prescription refill through the mail-order pharmacy and who were confronted with the choice of using an SST or other ordering options

Most customers use the mail-order pharmacy to order prescription refills for illnesses that require continual medication (e g , diabetes) Therefore, customers are regularly (every 90 days) faced with the decision of ordering through the SST or not Prescription refill requests can be filled through non-SST alternatives (speaking with a live customer service representative or mailing a refill request) or one of the SST alternatives (an interactive voice response [IVR] telephone system or an Internet-based system) Study 1 explores the IVR telephone system, which is fully automated so that the customer does not talk to a company representative Study 2 explores the Internet-based SST, which is also fully automated through the company's Web site and has no live support from employees There is no financial cost difference for customers between the ordering options, and they can select either option Company representatives estimated that at the times of data collection, a majority of the firm's customers had not yet tried the SST At the time of the IVR study, the Internet ordering option was not yet available

Survey Development

We developed a self-administered cross-sectional survey to explore the variables in the conceptual model We used a multistep process to develop the survey instrument We used existing scales for all measures except previous experience and perceived risk The survey was reviewed by 14 employees of the sponsoring firm, and after necessary changes were made, we pretested the survey instrument with a convenience sample of 21 participants to assess its clarity The instrument was then administered to a small group of mail-order pharmacy customers for further insight During this process, wording was adapted as needed, and ambiguous questions were clarified or deleted Final items included in the survey and their sources appear in the Appendix

Measure Purification

We assessed all multiple-item measures on seven-point Likert scales with the endpoints "strongly disagree" and "strongly agree" Trial, the key dependent variable, was assessed with a single-item question that indicated whether the customer had used the SST before To verify the validity of the measures, we created a measurement model and tested it with the CALIS procedure in SAS using data from Study 1 We tested all four consumer readiness variables, six innovation characteristic variables, and four individual difference variables As a result of this process, we dropped one item from the original measure for ability, observability, trialability, perceived risk, and need for interaction The measurement model fit was acceptable chi-square = 2286, degrees of freedom = 690 (chi-square/degrees of freedom = 3 3), comparative fit index = 9452, nonnormed fit index = 9349, and root mean square error of approximation = 0555 (Hair et al 1998)

We also conducted tests to assess the reliability and validity of the factors and their indicators The alpha values for the latent constructs were sufficiently high (see the

Appendix), and most of the variance extracted values are greater than 70 (Hair et al 1998) We established convergent validity by examining the t-tests for factor loadings, and all are significant ($p <$ 0001) We established discriminant validity using the confidence interval test and the variance extracted test (Hatcher 1994) In addition, a correlation matrix with means, standard deviations, reliabilities, and correlations among variables appears in Table 2 On the basis of the overall pattern of positive results, we are confident in the revised measurement model and the measures To maintain consistency in Study 2, we used purified measures from Study 1[1]

Analysis Approach

To assess the hypotheses empirically, we analyzed a series of multiple regression and logistic regression models We did not use simultaneous path analysis, because the key dependent variable, trial, is a discrete variable with no continuous latent variable underlying the construct Path analysis assumes multivariate normality in the dependent variable, which is not the case here In addition, the large number of constructs that we explore exceeds the recommended ratio of number of indicators to sample size for path analysis (Hair et al 1998, Hatcher 1994) Therefore, a series of regressions and logistic regression models provide a more effective analysis approach to test the hypotheses

To test for mediation, we used a four-step process (Baron and Kenny 1986) The first step is to ensure that the selected mediator has a significant influence on trial The second step is to assess the impact of the antecedent predictors on trial The third step is to regress the antecedent predictors on the selected mediator variable The fourth step is to assess the influence of the selected mediator with the antecedent predictors on trial In the fourth step, the influence of the antecedent predictors (established in Step 2) must be lessened when they are modeled with the selected mediator variable (in Step 4) We used logistic regression for Steps 1, 2, and 4 in which trial is the dependent variable, and we used multiple regression for Step 3

Complete mediation is rarely observed with behavioral data, therefore, partial mediation is a more realistic expectation Complete mediation occurs when the inclusion of the selected mediator variable (in Step 4) eliminates any significant influence of the antecedent predictor on trial Partial mediation occurs when the inclusion of a mediator variable (in Step 4) reduces the significance of the influence of the antecedent predictors from Step 2 (Baron and Kenny 1986) To determine a reduction of the influence of the antecedent predictors between Steps 2 and 4, we examined changes in the beta coefficients and p-values An implication of this data analysis approach is that comparisons across the steps in the process require the testing of individual mediators (Baron and Kenny 1986, Ocker and Morand 2002) Thus, we conducted this four-step process eight separate times to test for all possible mediating effects in Study 1 We tested each of the consumer readiness variables individually as a mediator between the individual differences variables and trial, followed by an assessment of each readiness variable as a mediator between the innovation characteristics and trial

Study 1 Results

Sample

Study 1 explores customer trial of the IVR telephone-based SST At the time of data collection, the Internet-based SST was not available, and the IVR system had been in place for less than one year More than 60,000 customers who had recently placed orders using the IVR system were identified, and 800 were randomly selected for the study At the same time, more than 60,000 customers who had recently placed orders but did not use the IVR system were identified, and 1200 were randomly selected for the study[2] A total of 2000 surveys were mailed, and 406 users and 499 nonusers returned the survey Of these, 77 surveys were unusable, resulting in a total of 828 usable responses, for an overall response rate of 41% (828/2000) More women (57%) responded to the survey than men (43%), and ages ranged from 21 to 94 years, with an average age of 56 years Approximately 75% of the respondents were between 40 and 69 years of age The most common educational category was "some college education" (28%), however, a significant percentage (20%) had graduate degrees Income was distributed normally, except for a large group (25%) that had an income of more than $90,000 per year

Tests of Model and Hypotheses

The first step in the test for mediation determines whether the proposed mediator (role clarity, motivation, or ability) has a significant, direct effect on trial We tested each of the mediating variables individually using logistic regression, and all had a significant, positive influence on trial All were significant ($p <$ 0001), with strong classification-accuracy statistics The classification accuracy for the role clarity mediator is 86%, indicating that 86% of the sample was correctly classified into the trial (or no-trial) group on the basis of the role clarity score Classification-accuracy measures for extrinsic and intrinsic motivation and ability were 73%, 67%, and 78%, respectively

We also analyzed results using an independent-samples t-test to determine whether the means for each of the consumer readiness variables are significantly different between the trial and no-trial groups The mean scores for role clarity were 6 4 and 3 6 for triers and nontriers, respectively (t-value = 25 8, $p <$ 0001) Mean scores for ability were 6 7 and 4 8 for triers and nontriers, respectively (t-

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[1] Full details on the measurement model are available in a technical appendix, which can be acquired from the lead author

[2] We selected more IVR nonusers to compensate for the possibility that some participants who identified with the nonuser group had actually used the IVR SST between the time they identified as a nonuser and the completion of the survey We did this in an attempt to generate roughly equal sample sizes for the SST user and nonuser groups

TABLE 2
Means, Standard Deviations, Reliabilities, and Correlations Among Variables

Variable	Mean	Standard Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Role clarity	5 22	1 99	96													
2 Ability	5 99	1 56	69**	94												
3 Intrinsic motivation	1 81	1 61	28**	30**	N/A											
4 Extrinsic motivation	2 72	1 22	41**	53**	63**	N/A										
5 Inertia	4 18	1 90	–05	–07	–09*	–03	90									
6 Technology anxiety	2 32	1 55	–29**	–33**	–10**	–29**	18**	93								
7 Need for interaction	3 90	1 99	–26**	–28**	–15**	–40**	09**	33**	88							
8 Previous experience	5 18	1 53	32**	35**	09*	29**	–13**	–54**	–31**	72						
9 Relative advantage	4 99	1 83	47**	44**	53**	74**	–00	–30**	–43**	29**	95					
10 Compatibility	5 25	1 92	50**	54**	50**	74**	–09**	–36**	–43**	34**	81**	95				
11 Complexity	2 48	1 47	–51**	–53**	–42**	–62**	08*	40**	45**	–36**	–70**	–70**	83			
12 Observability	5 64	1 72	43**	49**	36**	55**	–13**	–37**	–32**	37**	58**	68**	–53**	92		
13 Trialability	5 27	1 74	43**	49**	43**	54**	–15**	–28**	–30	27**	54**	65**	–48**	55**	81	
14 Perceived risk	2 59	1 50	–49**	–43**	–33**	–52**	12**	44**	46**	–30**	–60**	–59**	64**	–44**	–43**	85

**p* < 05

***p* < 01

Notes The figures are based on data from Study 1 Sample sizes for the table range from 791 to 827 because of missing data We report means and standard deviations on the basis of a seven-point scale (except for intrinsic and extrinsic motivation, which we recalibrated [dividing by 100] to be in alignment with the other measures, intrinsic motivation uses a 0–5 scale, and extrinsic motivation uses a 0–4 scale) Correlation alphas are reported along the diagonal The expectancy theory conceptualization of motivation results in a single motivation score, thus we do not calculate an alpha N/A = not applicable value = 15.5, $p < .0001$). The trial group mean score for extrinsic motivation was 3.2, and the nontrial group mean score was 1.9 (t-value = 16.1, $p < .0001$).[3] Mean scores for intrinsic motivation were 2.3 and 1.1 for triers and nontriers, respectively (t-value = 11.1, $p < .0001$). The values show that participants in the trial group had significantly higher levels of role clarity, motivation (both intrinsic and extrinsic), and ability. The high p-values, strong classification-accuracy scores, and significant t-tests satisfy the first step in the test for mediation.

To assess the mediating power of the consumer readiness variables, we completed the remaining three steps in the test for mediation. Because of space limitations, it is impractical to discuss in detail the results from all eight multistep tests for mediation in Study 1.[4] Table 3 provides a summary of the findings for the eight tests for mediation in Study 1, showing the key comparisons between Step 2 and Step 4. For example, in the first test (role clarity as a mediator between the individual difference variables and trial), technology anxiety, need for interaction, and previous experience all had a significant, direct effect on trial in Step 2. However, in Step 4 (when the individual difference variables were modeled with role clarity), the effect became nonsignificant, indicating that role clarity completely mediates the main effects of technology anxiety, need for interaction, and previous experience on trial. In addition, the influence of inertia and age on trial went from highly significant (both at $p < .0001$) to a much less powerful influence ($p = .04$ for inertia, and $p = .003$ for age). The results indicate that role clarity partially mediates the relationship between inertia and age with trial.

The test for mediation for each antecedent predictor could fail in Steps 2, 3, or 4. Antecedent predictors that failed to have a significant influence in either Step 2 or Step 3 were discontinued from the mediation analysis (shown as a dash in the Step 4 column of Table 3). Failures in Step 2 indicate that the antecedent predictor did not have a direct effect on trial and thus could not be mediated by the consumer readiness variables. The failures to mediate are not due to limitations of the consumer readiness variables but rather to the weaknesses of the antecedent predictors. Sex and education were two individual difference variables that failed in Step 2.

The failures to mediate that are due to limitations in the consumer readiness variables are failures to mediate in either Step 3 or Step 4. Failures in Step 3 indicate that the antecedent predictor did not have a direct effect on the consumer readiness variable, and thus the consumer readiness variable cannot be a mediator. Failures in Step 4 indicate that when the antecedent predictor is modeled with the mediator, the influence of the antecedent predictor is not lessened. This indicates that the consumer readiness variable is not a mediator for that particular variable.

Overall, the pattern of results supports the conclusion that the consumer readiness variables mediate the effects of individual differences on trial. Of the eight individual difference antecedent predictors, only two were not mediated by the consumer readiness variables, and the failures were due to the inability of sex and education to show a direct link to trial. Of the six remaining variables, all were mediated by at least one of the consumer readiness variables. Need for interaction was mediated by all four readiness variables, whereas technology anxiety and age were mediated by three of the four readiness variables. In summary, all individual difference antecedent predictors that effect trial were mediated by the set of consumer readiness variables. The results provide support for H_{1a}.

With the innovation characteristics, a similar pattern emerges. Two of the antecedent predictors (complexity and observability) did not have a direct effect on trial and thus could not be mediated. Of the remaining four variables, three are mediated by at least two of the readiness variables. Relative advantage was not mediated by any of the consumer readiness variables. Compatibility was mediated by three of the four readiness variables, and perceived risk and trialability were mediated by two of the readiness variables. Therefore, the only innovation characteristic not mediated by the readiness variables was relative advantage. The overall pattern of results also provides support for H_{1b}.

It is also insightful to explore the relative mediating power of the consumer readiness variables. In Study 1, it appears that role clarity and ability were the strongest mediators, both mediating five of the six individual difference antecedent predictors that were eligible for mediation. Extrinsic and intrinsic motivation are important mediators, though they mediated only three and two (respectively) of the six individual difference antecedent predictors that were eligible for mediation. The same pattern held when we evaluated the relative mediating power of the consumer readiness variables on the innovation characteristic antecedent predictors. Role clarity and ability mediated three of the four eligible antecedent predictors, and extrinsic and intrinsic motivation mediated one and none of the antecedent predictors, respectively.

Study 2 Results

Replicating Study 1 with a different SST helps determine the strength of the results and provides a further test of the model. In the replication study, the SST of interest was an Internet ordering system for prescription refills that was offered by the same company. The company implemented the Internet ordering system several months after the completion of Study 1, and the system had been in place less than six months at the time of data collection. We collected data from current mail-order pharmacy customers who had the option of using the Internet SST or placing an order

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[3] Whereas all Likert scale measures used a 1–7 scale, extrinsic motivation uses a 0–4 scale, and intrinsic motivation uses a 0–5 scale. The expectancy theory's conceptualization of motivation uses a multiplicative function to generate a motivation score, which was significantly out of alignment with other measures and was recalibrated (by dividing the motivation scores by 100). This has no impact on the data analysis other than bringing the motivation measures into alignment with the other scales.

[4] Full details are provided in a technical appendix, which is available from the lead author.

TABLE 3
Study 1 (IVR) Results of Tests for Mediation

Description of Test	Significance of Mediator. Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between individual difference variables and trial	Role clarity 1 3 (0001)	Inertia	– 19 (0001)	– 12 (04)	**Partial mediation**
		Technology anxiety	– 13 (01)	n s	**Completely mediates main effects**
		Need for interaction	– 18 (0001)	n s	**Completely mediates main effects**
		Previous experience	15 (002)	n s	**Completely mediates main effects**
		Age	– 19 (0001)	– 03 (003)	**Partial mediation**
		Income	12 (02)	—	No mediation, failed in Step 3
		Sex	n s	—	No direct effect on trial
		Education	n s	—	No direct effect on trial
Extrinsic motivation as a mediator of the relationship between individual difference variables and trial	Extrinsic motivation 1 0 (0001)	Inertia	– 19 (0001)	—	No mediation, failed in Step 3
		Technology anxiety	– 13 (01)	n s	**Completely mediates main effects**
		Need for interaction	– 18 (0001)	n s	**Completely mediates main effects**
		Previous experience	15 (002)	19 (001)	No mediation, failed in Step 4
		Age	– 19 (0001)	n s	**Completely mediates main effects**
		Income	12 (02)	—	No mediation, failed in Step 3
		Sex	n s	—	No direct effect on trial
		Education	n s	—	No direct effect on trial
Intrinsic motivation as a mediator of the relationship between individual difference variables and trial	Intrinsic motivation 53 (0001)	Inertia	– 19 (0001)	– 18 (0002)	**Partial mediation**
		Technology anxiety	– 13 (01)	—	No mediation, failed in Step 3
		Need for interaction	– 18 (0001)	– 14 (002)	**Partial mediation**
		Previous experience	15 (002)	21 (001)	No mediation, failed in Step 4
		Age	– 19 (0001)	—	No mediation, failed in Step 3
		Income	12 (02)	13 (0004)	No mediation, failed in Step 4
		Sex	n s	—	No direct effect on trial
		Education	n s	—	No direct effect on trial
Ability as a mediator of the relationship between individual difference variables and trial	Ability 1 3 (0001)	Inertia	– 19 (0001)	—	No mediation, failed in Step 3
		Technology anxiety	– 13 (01)	n s	**Completely mediates main effects**
		Need for interaction	– 18 (0001)	n s	**Completely mediates main effects**
		Previous experience	15 (002)	n s	**Completely mediates main effects**
		Age	– 19 (0001)	– 02 (004)	**Partial mediation**
		Income	12 (02)	n s	**Completely mediates main effects**
		Sex	n s	—	No direct effect on trial
		Education	n s	—	No direct effect on trial

TABLE 3
Continued

Description of Test	Significance of Mediator Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between innovation characteristic variables and trial	Role clarity 1 3 (0001)	Perceived risk	– 28 (0001)	n s	**Completely mediates main effects**
		Relative advantage	32 (0002)	—	No mediation, failed in Step 3
		Complexity	n s	—	No direct effect on trial
		Compatibility	34 (0002)	31 (002)	**Partial mediation**
		Trialability	17 (01)	n s	**Completely mediates main effects**
		Observability	n s	—	No direct effect on trial
Extrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Extrinsic motivation 1 0 (0001)	Perceived risk	– 28 (0001)	—	No mediation, failed in Step 3
		Relative advantage	32 (0002)	36 (0001)	No mediation, failed in Step 4
		Complexity	n s	—	No direct effect on trial
		Compatibility	34 (0002)	32 (0003)	**Partial mediation**
		Trialability	17 (01)	18 (01)	No mediation, failed in Step 4
		Observability	n s	—	No direct effect on trial
Intrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Intrinsic motivation 53 (0001)	Perceived risk	– 28 (0001)	—	No mediation, failed in Step 3
		Relative advantage	32 (0002)	41 (0001)	No mediation, failed in Step 4
		Complexity	n s	—	No direct effect on trial
		Compatibility	34 (0002)	37 (0001)	No mediation, failed in Step 4
		Trialability	17 (01)	20 (003)	No mediation, failed in Step 4
		Observability	n s	—	No direct effect on trial
Ability as a mediator of the relationship between innovation characteristic variables and trial	Ability 1 3 (0001)	Perceived risk	– 28 (0001)	– 22 (01)	**Partial mediation**
		Relative advantage	32 (0002)	33 (0003)	No mediation, failed in Step 4
		Complexity	n s	—	No direct effect on trial
		Compatibility	34 (0002)	22 (01)	**Partial mediation**
		Trialability	17 (01)	n s	**Completely mediates main effects**
		Observability	n s	—	No direct effect on trial

Notes The numbers shown are maximum likelihood parameter estimates, and *p*-values (based on Wald chi-square significance test) are shown in parentheses All nonsignificant (n s) relationships indicate a *p*-value greater than 05 Text shown in bold indicates a relationship in which the mediator either completely or partially mediates the relationship between the antecedent variable and trial through other means (i.e., mail, IVR SST, or a customer service representative on the telephone).

Sample

For Study 2, we used the same sampling procedure as that in Study 1. Of the 2000 surveys mailed, 401 usable surveys were returned from SST users, and 333 usable surveys were returned from SST nonusers. The overall response rate in the Study 2 was 37% (734/2000), and sample demographics closely matched those in Study 1.

Tests of Model and Hypotheses

The first step in the test for mediation shows that role clarity, motivation (both extrinsic and intrinsic), and ability all have significant, direct effects on trial. All were tested individually with logistic regression and were highly significant ($p < .0001$), with strong classification-accuracy scores. Classification-accuracy scores were 92% for role clarity, 78% for extrinsic motivation, 72% for intrinsic motivation, and 83% for ability.

We also analyzed results using an independent-samples t-test to determine whether the means for each of the consumer readiness variables are significantly different between the trial and no-trial groups, as they were in Study 1. Mean scores for role clarity are 6.4 and 2.9 for triers and nontriers, respectively (t-value = 33.6, $p < .0001$). Mean scores for ability are 6.6 and 4.1 for triers and nontriers, respectively (t-value = 19.8, $p < .0001$). The trial group mean score for extrinsic motivation is 3.3, and the nontrial group mean score is 1.7 (t-value = 19.4, $p < .0001$). Mean scores for intrinsic motivation are 2.5 and 1.2 for triers and nontriers, respectively (t-value = 11.4, $p < .0001$). The high *p*-values, strong classification-accuracy scores, and significant t-tests verify the link between the consumer readiness variables and trial that we established in Study 1.

To confirm the mediating power of the consumer readiness variables that we established in Study 1, we completed the remaining three steps in the test for mediation. Table 4 provides a summary of the findings for the eight tests for mediation in Study 2, showing the key comparison between Steps 2 and 4. The individual difference variables of technology anxiety and education did not have a direct effect on trial. The variables could not be mediated because of their failure in Step 2. As with Study 1, there were a handful of mediation failures in Steps 3 and 4.

As in Study 1, the positive pattern of results supports the mediating role of the consumer readiness variables. Of the eight individual difference antecedent predictors, only two (technology anxiety and education) were not mediated by at least one consumer readiness variable, and the failures were due to the inability of the antecedent predictor to significantly influence trial. Of the six remaining variables that were eligible for mediation, all were mediated by at least one of the readiness variables. Need for interaction, previous experience, age, and income were mediated by all four readiness variables, and sex was mediated by three of the four. Therefore, as in Study 1, all individual difference variables that had a direct effect on trial were meditated by the set of consumer readiness variables. The results provide support for H_{1a}.

We found similar results in the replication of the mediation of the innovation characteristics. Trialability and observability did not have a direct effect on trial and thus could not be mediated. Of the remaining four variables, all were mediated by at least one of the readiness variables. Therefore, all innovation characteristic variables that had a direct effect on trial were mediated by the set of consumer readiness variables. However, as in Study 1, intrinsic motivation failed to mediate any of the innovation characteristic variables. The overall pattern of results provides support for H_{1b}.

It is also insightful to explore the relative mediating power of the consumer readiness variables. In Study 2, role clarity was again the strongest mediator, mediating all six of the eligible individual difference variables. The other three readiness variables were also strong mediators; intrinsic motivation and ability mediated five of the six individual difference variables, and extrinsic motivation mediated four. With respect to innovation characteristics, role clarity again mediated the most antecedent predictors, mediating three of the remaining four innovation characteristic antecedent predictors. Extrinsic motivation mediated two, and ability mediated one innovation characteristic.

Relative Importance of Consumer Readiness

With the consumer readiness variables established as mediators across two studies, it is valuable to explore the overall effectiveness and relative strength of the consumer readiness variables as a group. Although we conducted the test for mediation one consumer readiness mediator at a time (because of methodological considerations), the group of predictors can be regressed on trial when they are separated from the test for mediation. Across both studies, the consumer readiness variables, when taken as a group, generated high-classification-accuracy statistics. The classification scores were 86% and 93% for IVR and Internet studies, respectively (see Table 5). The high scores indicate that 86% (93%) of the respondents in the IVR (Internet) study were correctly classified into the trial or no-trial groups on the basis of their consumer readiness variable scores. The regression results also help determine the relative strength of the consumer readiness variables. In both studies, the other consumer readiness variables in the model overwhelmed the impact of ability (see Table 5). Intrinsic motivation was only marginally significant ($p = .09$) in the IVR study, and it was nonsignificant in the Internet-based study. Thus, role clarity and extrinsic motivation were the two strongest consumer readiness predictors.

In addition to exploring the relative strength of the consumer readiness variables, it is illuminating to compare the three sets of predictors that we have explored: consumer readiness, innovation characteristics, and individual differences. As Table 5 shows, the consumer readiness set of predictors generated a higher classification-accuracy score than did either of the other sets of variables across both studies. Based on the classification-accuracy scores, the consumer readiness variables are the best set of predictors, followed by the innovation characteristics, and finally the individual

TABLE 4
Study 2 (Internet) Results of Tests for Mediation

Description of Test	Significance of Mediator· Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between individual difference variables and trial	Role clarity 1 4 (0001)	Inertia	– 20 (0002)	– 21 (01)	**Partial mediation**
		Technology anxiety	n s	—	No direct effect on trial
		Need for interaction	– 28 (0001)	– 24 (01)	**Partial mediation**
		Previous experience	61 (0001)	23 (02)	**Partial mediation**
		Age	– 03 (0002)	n s	**Completely mediates main effects**
		Income	12 (0003)	n s	**Completely mediates main effects**
		Sex	– 47 (007)	n s	**Completely mediates main effects**
		Education	n s	—	No direct effect on trial
Extrinsic motivation as a mediator of the relationship between individual difference variables and trial	Extrinsic motivation 1 3 (0001)	Inertia	– 20 (0002)	—	No mediation, failed in Step 3
		Technology anxiety	n s	—	No direct effect on trial
		Need for interaction	– 28 (0001)	n s	**Completely mediates main effects**
		Previous experience	61 (0001)	46 (0001)	**Partial mediation**
		Age	– 03 (0002)	n s	**Completely mediates main effects**
		Income	12 (0003)	n s	**Completely mediates main effects**
		Sex	– 47 (007)	—	No mediation, failed in Step 3
		Education	n s	—	No direct effect on trial
Intrinsic motivation as a mediator of the relationship between individual difference variables and trial	Intrinsic motivation 58 (0001)	Inertia	– 20 (0002)	—	No mediation, failed in Step 3
		Technology anxiety	n s	—	No direct effect on trial
		Need for interaction	– 28 (0001)	– 23 (0001)	**Partial mediation**
		Previous experience	61 (0001)	53 (0001)	**Partial mediation**
		Age	– 03 (0002)	n s	**Completely mediates main effects**
		Income	12 (0003)	10 (02)	**Partial mediation**
		Sex	– 47 (007)	n s	**Completely mediates main effects**
		Education	n s	—	No direct effect on trial
Ability as a mediator of the relationship between individual difference variables and trial	Ability 1 2 (0001)	Inertia	– 20 (0002)	—	No mediation, failed in Step 3
		Technology anxiety	n s	—	No direct effect on trial
		Need for interaction	– 28 (0001)	– 16 (01)	**Partial mediation**
		Previous experience	61 (0001)	33 (0001)	**Partial mediation**
		Age	– 03 (0002)	n s	**Completely mediates main effects**
		Income	12 (0003)	n s	**Completely mediates main effects**
		Sex	– 47 (007)	n s	**Completely mediates main effects**
		Education	n s	—	No direct effect on trial

TABLE 4
Continued

Description of Test	Significance of Mediator: Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between innovation characteristic variables and trial	Role clarity 1 4 (0001)	Perceived risk	– 34 (0004)	– 23 (04)	**Partial mediation**
		Relative advantage	42 (0002)	49 (001)	No mediation, failed in Step 4
		Complexity	– 46 (0001)	n s	**Completely mediates main effects**
		Compatibility	43 (0001)	27 (07)	**Partial mediation**
		Trialability	n s	—	No direct effect on trial
		Observability	n s	—	No direct effect on trial
Extrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Extrinsic motivation 1 3 (0001)	Perceived risk	– 34 (0004)	—	No mediation, failed in Step 3
		Relative advantage	42 (0002)	38 (001)	**Partial mediation**
		Complexity	– 46 (0001)	– 56 (0001)	No mediation, failed in Step 4
		Compatibility	43 (0001)	39 (001)	**Partial mediation**
		Trialability	n s	—	No direct effect on trial
		Observability	n s	—	No direct effect on trial
Intrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Intrinsic motivation 58 (0001)	Perceived risk	– 34 (0004)	—	No mediation, failed in Step 3
		Relative advantage	42 (0002)	1 1 (0001)	No mediation, failed in Step 4
		Complexity	– 46 (0001)	—	No mediation, failed in Step 3
		Compatibility	43 (0001)	—	No mediation, failed in Step 3
		Trialability	n s	—	No direct effect on trial
		Observability	n s	—	No direct effect on trial
Ability as a mediator of the relationship between innovation characteristic variables and trial	Ability 1 2 (0001)	Perceived risk	– 34 (0004)	—	No mediation, failed in Step 3
		Relative advantage	42 (0002)	—	No mediation, failed in Step 3
		Complexity	– 46 (0001)	– 41 (001)	**Partial mediation**
		Compatibility	43 (0001)	63 (0001)	No mediation, failed in Step 4
		Trialability	n s	—	No direct effect on trial
		Observability	n s	—	No direct effect on trial

Notes The numbers shown are maximum likelihood parameter estimates, and *p*-values (based on Wald chi-square significance test) are shown in parentheses All nonsignificant (n s) relationships indicate a *p*-value greater than 05 Text shown in bold indicates a relationship in which the mediator either completely or partially mediates the relationship between the antecedent variable and trial

TABLE 5
Alternative Models for Predicting Trial

	Study 1: IVR			Study 2: Internet		
Predictors of Trial	**Consumer Readiness Model**	**Innovation Characteristics Model**	**Individual Differences Model**	**Consumer Readiness Model**	**Innovation Characteristics Model**	**Individual Differences Model**
Role clarity	23 (0001)	—	—	1 2244 (0001)	—	—
Ability	n s	—	—	n s	—	—
Extrinsic motivation	11 (0001)	—	—	2289 (0025)	—	—
Intrinsic motivation	0262 (0945)	—	—	n s	—	—
Perceived risk	—	–28 (0001)	—	—	–34 (0003)	—
Relative advantage	—	32 (0002)	—	—	42 (0002)	—
Complexity	—	n s	—	—	–46 (0001)	—
Compatibility	—	34 (0002)	—	—	43 (0001)	—
Trialability	—	17 (01)	—	—	n s	—
Observability	—	n s	—	—	n s	—
Inertia	—	—	–19 (0001)	—	—	–20 (0002)
Technology anxiety	—	—	–13 (01)	—	—	n s
Need for interaction	—	—	–18 (0001)	—	—	–28 (0001)
Previous experience	—	—	15 (002)	—	—	61 (0001)
Age	—	—	–19 (0001)	—	—	–03 (0002)
Income	—	—	12 (02)	—	—	12 (0002)
Sex	—	—	n s	—	—	–47 (007)
Education	—	—	n s	—	—	n s
Classification accuracy	86%	79%	65%	93%	86%	74%

Notes n s = not significant

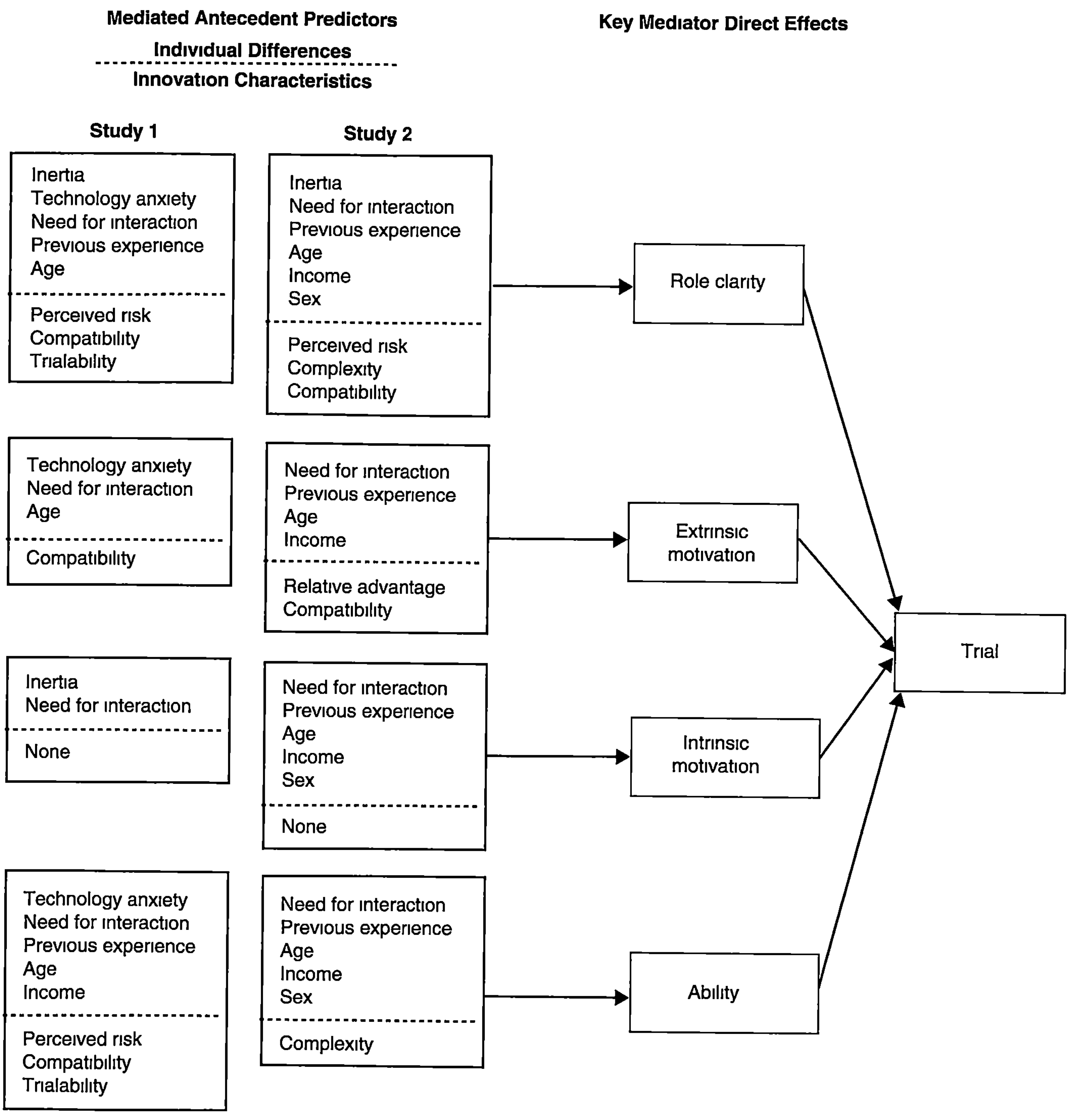
difference variables The consistency of results across the two studies further strengthens the findings Overall, this comparison of predictor models provides support for H_2

Discussion

Summary of Results

The findings from both studies support the proposed model The direct effects of the consumer readiness variables on trial were significant across both studies Most important, the mediating effects (H_1) of the consumer readiness variables were replicated across two studies that focused on different SSTs In Study 1, of the ten antecedent predictors that had a direct effect on trial, only one (relative advantage) was not mediated by any of the consumer readiness variables In Study 2, all ten antecedent predictors that had a direct effect on trial were mediated by at least one of the consumer readiness variables Figure 2 summarizes the mediating effects found in Studies 1 and 2 The findings support the central role of the consumer readiness variables as key mediators to better understand when and why consumer trial occurs Examining the strength of consumer readiness variables as predictors of trial in comparison with that of the antecedent predictors provides further reinforcement for the importance of the consumer readiness variables In Studies 1 and 2, the consumer readiness variables were stronger predictors of trial than were either the set of

FIGURE 2
Significant Mediated Effects



innovation characteristics or individual differences, thus providing support for H_2.

Although all consumer readiness variables are important, the mediation results (H_1) and the predictive comparisons (H_2) suggest that role clarity and extrinsic motivation are the dominant consumer readiness variables in the prediction of trial for this context. Indeed, although ability mediated several antecedent predictors in each study, its direct influence on trial was overwhelmed by the stronger effects of role clarity and extrinsic motivation when all the factors were modeled together to predict trial. Similarly, intrinsic motivation was only marginally significant in the prediction of trial when all consumer readiness variables were tested

Research Contributions

The model and results contribute significantly to our theoretical understanding of the factors that influence consumer trial The traditional adoption model variables and attitudes explored in previous research are not disputed However, the added explanatory power of the consumer readiness variables and their role as mediators are significant In practice, consumers may evaluate a new product or service positively, yet they may choose not to try it Our results suggest that lack of "consumer readiness" can explain much of this failure to try That is, even customers who have a positive evaluation of an innovative service may choose not to use it if they do not understand their role (role clarity), if they perceive no clear benefit to using it (motivation), or if they believe that they are not able to use it (ability)

Our findings suggest that the consumer readiness variables are not only additional predictors but also key factors with strong mediating properties The mediating role of the consumer readiness variables also provides a partial answer to the "why" question with respect to several innovation characteristics and individual difference variables that have been tested in previous research For example, extensive literature concludes that as experience with related technologies increases, the chance of adopting a new technology also increases The consumer readiness mediators help explain why this relationship exists In Study 2, it is not merely that increased experience with Internet-based tools leads to a greater likelihood of trial but also that increased experience leads to higher levels of role clarity, motivation (both extrinsic and intrinsic), and ability relative to the Internet ordering system, which increases the likelihood of trial

Even more important are situations in which data might be misinterpreted without including the mediating variables For example, in Study 1, complexity did not have a direct effect on trial If the mediators are not included, the natural conclusion is that complexity does not influence trial behavior However, we found that complexity has a significant, negative influence on role clarity (– 23, $p <$ 0001), extrinsic motivation (– 10, $p <$ 004), and ability (– 28, $p <$ 0001), which in turn decreases the likelihood of trial Although this is not technically a mediated relationship, complexity is nonetheless an important factor to consider because of its influence on the consumer readiness variables We found a similar result with observability in Study 1 and with trialability, observability, and technology anxiety in Study 2

Another contribution of this study is that it establishes a more concise set of constructs as better predictors of trial The key consumer readiness variables show more consistency in their influence on trial across two different technologies as well as higher classification-accuracy scores than do traditional innovation characteristics and individual difference variables Our model and results suggest that the relevant variables for increasing trial are those that increase consumer readiness

Managerial Implications

For many firms, often the challenge is not managing the technology but rather getting consumers to try the technology The findings should be useful to firms that are considering SST implementation as well as those that are struggling with the management of existing SSTs This is especially relevant given a study that Forrester Research conducted, which shows that 41% of the firms surveyed observe no return on their self-service investments (Zurek et al 2001) By establishing the consumer readiness variables as key mediators, we provide an actionable set of factors to help firms understand and influence SST trial behavior, a key driver of SST success Managers can use tactical strategies to influence role clarity, motivation, and ability either before or after an SST has been introduced.

Management can take several steps to influence the actionable consumer readiness variables directly (Bitner, Ostrom, and Meuter 2002) For example, education and training, in the form of detailed, customer-friendly instructions or aids, are important in influencing role clarity Contextually relevant education aids, such as wallet cards, magnets, and mouse pads with instructions (for SSTs used from home) or posters showing the steps to use the SST (for SSTs in remote locations), could be used to build role clarity and perceptions of ability In addition, considerable "hand holding" should be readily available in accessing and using the SST For example, if the SST is available on the Internet, management could consider a robust "first-time user" area and provide detailed instructions and frequently asked questions, a toll-free telephone number, and online help such as live text chat

Motivation is another actionable consumer readiness variable that drives SST trial To encourage trial, firms must clearly communicate valued customer benefits of an SST For example, some consumers find appeal in SSTs that save them time or money, whereas others are attracted to the extended availability or easier access To provide added motivation for potential first-time users, firms should give consumers the opportunity to try the SST with no obligations When technologically feasible, offering the opportunity to interact with and learn from other consumers may also be appealing to consumers and increase their motivation to try

This research also contributes to the understanding of variables that underlie effective customer coproduction To be truly customer centric, firms need to strengthen the effectiveness of their customers as coproducers and cocreators of value (Vargo and Lusch 2004) Applying employee-management practices to customers can lead to effective coproduction by increasing role clarity, motivation, and ability of customers The coproduction framework provides a lens through which firms can develop, adjust, and evaluate their operational procedures, technology friendliness, human resource practices, and performance criteria (Bettencourt et al 2002) Effective coproduction can increase the likelihood of product or service success and customer satisfaction and can present a competitive opportunity for firms

Limitations and Future Research Directions

As with any research, there are limitations associated with the studies First, we use cross-sectional data rather than a longitudinal study Time and cost constraints limited the feasibility of such an approach Second, there is limited generalizability to other contexts, because we conducted this research within one organizational context Additional studies in more diverse industries with other consumer groups should be conducted to provide additional support and increase the generalizability of the findings

Beyond addressing the limitations, this research suggests opportunities for further research A central question that remains unanswered is, What are the key drivers of role clarity, the most influential mediator in the set of consumer readiness variables? The antecedent predictors—need for interaction, previous experience, perceived risk, and complexity—appear to be the most consistent predictors of role clarity, so further research can explore the antecedents in more detail In addition, prior research investigating the role clarity of employees in a work setting suggests that the nature of socialization activities (i e , their content, context, and social aspects) and the feedback provided can affect role clarity perceptions (Anakwe and Greenhaus 1999, Bettencourt and Brown 2003) In the context of health care compliance, it was shown that provider characteristics influence role clarity (Dellande, Gilly, and Graham 2004) Thus, further research could investigate provider characteristics, the socialization of consumers, and the role of feedback for various customer groups and SSTs

The conceptual model provides a framework for additional research Although trial was the central dependent variable in this study, any of the other steps in the adoption process could be explored in detail For example, the critical factors that influence commitment to SSTs or those that influence the investigation or evaluation steps that precede trial could be developed and tested Along these lines, research could assess the differential influence of the consumer readiness variables across the stages in the adoption process

Further research could also explore how SST usage influences consumer loyalty and, ultimately, revenue and profitability Despite the increase in SSTs that firms are offering, scholars are just beginning to learn about how the absence of human interaction affects the bond between consumers and firms (Selnes and Hansen 2001) It is important to understand the long-term implications of shifting customers away from interpersonal interactions, which are traditionally viewed as important elements for establishing trust and loyalty in service contexts Finally, additional research could extend the study of coproduction beyond SSTs to other contexts This rich area of inquiry would benefit from studies in multiple contexts to determine what relevant antecedents increase consumer readiness and the differential influence of role clarity, motivation, and ability on trial in other high-customer-participation settings

APPENDIX
Measures, Sources, Items, and Alpha Coefficients

	Coefficient Alpha	
	Study 1	**Study 2**
Consumer Readiness		
Role Clarity (five items adapted from Rizzo, House, and Lirtzman [1970])	96	94
•I feel certain about how to effectively use the SST[a]		
•I am NOT sure how to use the SST properly		
•I know what is expected of me if I use the SST		
•The steps in the process of using the SST are clear to me		
•I believe there are only vague directions regarding how to use the SST		
Ability (six items adapted from Jones [1986] and Oliver and Bearden [1985])	94	96
•I am fully capable of using the SST		
•I am confident in my ability to use the SST		
•Using the SST is well within the scope of my abilities		
•I do NOT feel I am qualified for the task of ordering a prescription refill with the SST		
•My past experiences increase my confidence that I will be able to successfully use the SST		
•In total, using the SST sometimes involves things that are more difficult than I am capable[b]		
Extrinsic Motivation (three expectancy items adapted from Tyagi [1985], four instrumentality and four valence items created for the context)	N/A[c]	N/A
Expectancy		
•If I put forth the effort, I could successfully order a refill prescription with the SST		
•If I tried to use the SST, my prescription would be ordered successfully		
•Making the effort to use the SST would result in the refill being ordered successfully		

APPENDIX
Continued

	Coefficient Alpha	
	Study 1	Study 2
Instrumentality		
•Using the SST would provide me with added convenience		
•Using the SST would allow me to order a refill more quickly		
•Using the SST would allow me to order a refill whenever I want		
•Using the SST would provide me more control over the refill ordering process		
Valence		
•When I order a prescription refill, convenience is desirable		
•When I order a prescription refill, being able to order a refill quickly is desirable		
•When I order a prescription refill, being able to order a refill whenever I want is desirable		
•When I order a prescription refill, having control over the refill ordering process is desirable		
Intrinsic Motivation (three expectancy items adapted from Tyagi [1985], five instrumentality and five valence items created for the context)	N/A	N/A
Expectancy		
•If I put forth the effort, I could successfully order a refill prescription with the SST		
•If I tried to use the SST, my prescription would be ordered successfully		
•Making the effort to use the SST would result in the refill being ordered successfully		
Instrumentality		
•Using the SST would provide me with personal feelings of worthwhile accomplishment		
•Using the SST would provide me with feelings of enjoyment from using the technology		
•Using the SST would provide me with feelings of independence		
•Using the SST would allow me to feel innovative in how I interact with a service provider		
•Using the SST would allow me to have increased confidence in my skills		
Valence		
•When I order a refill, a personal feeling of worthwhile accomplishment is desirable		
•When I order a prescription refill, a personal feeling of enjoyment is desirable		
•When I order a prescription refill, a feeling of independence is desirable		
•When I order a refill, feeling innovative in how I interact with a service provider is desirable		
•When I order a prescription refill, increased confidence in my skills is desirable		
Individual Differences		
Inertia (three items adapted from Gremler [1995])	90	91
•Changing refill ordering methods would be a bother		
•For me, the cost in time, effort, and grief to switch prescription refill ordering methods is high		
•It's just not worth the hassle for me to switch prescription refill ordering methods		
Technology Anxiety (four items adapted from Raub [1981])	93	93
•I feel apprehensive about using technology		
•Technical terms sound like confusing jargon to me		
•I have avoided technology because it is unfamiliar to me		
•I hesitate to use most forms of technology for fear of making mistakes I cannot correct		
Need for Interaction (three items adapted from Dabholkar [1996])	88	87
•Personal contact with an employee makes ordering a prescription refill enjoyable for me		
•Personal attention by a customer service employee is important to me		
•It bothers me to use a machine when I could talk to a live person instead[b]		
Previous Experience (three items created for the context of interest)	72	81
•I commonly use lots of automated systems when dealing with other businesses		
•I do not have much experience using the Internet		
•I use a lot of technologically based products and services		
Innovation Characteristics		
Compatibility (three items adapted from Moore and Benbasat [1991])	95	97
•Using the SST is compatible with my lifestyle		
•Using the SST is completely compatible with my needs		
•The SST fits well with the way I like to get things done		

APPENDIX
Continued

	Coefficient Alpha	
	Study 1	Study 2
Relative Advantage (three items adapted from Moore and Benbasat [1991])	95	95
•Using the SST improves the prescription refill process		
•Overall, I believe using the SST is advantageous		
•I believe the SST, in general, is the best way to order a prescription refill		
Complexity (three items adapted from Moore and Benbasat [1991])	83	88
•I believe that the SST is cumbersome to use		
•It is difficult to use the SST		
•I believe that the SST is easy to use		
Observability (three items adapted from Moore and Benbasat [1991])	92	94
•I would have no difficulty telling others about the results of using the SST		
•I believe I could communicate to others the outcomes of using the SST		
•The results of using the SST are apparent to me [b]		
Trialability (three items adapted from Moore and Benbasat [1991])	81	85
•I can use the SST on a trial basis to see what it can do		
•It is easy to try out the SST without a big commitment		
•I've had opportunities to try out the SST [b]		
Perceived Risk (five items created for the context of interest)	85	87
•I fear using the SST reduces the confidentiality of my medical history		
•I am unsure if the SST performs satisfactorily		
•Using the SST infringes on my medical privacy		
•Overall, using the SST is risky		
•I am sure the SST performs as well as the other prescription refill ordering methods [b]		
Trial		
Trial (single-item measure created for the context of interest)	N/A	N/A
•Have you successfully completed a prescription refill request using the SST?		

[a] On the survey, "automated telephone refill system" and "Internet refill ordering system" were used instead of "SST"
[b] We dropped this item from the analysis during the measure purification process
[c] The expectancy theory conceptualization of motivation results in a single motivation score, thus we did not calculate an alpha score N/A = not applicable

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Christian Homburg, Nicole Koschate, & Wayne D. Hoyer

Do Satisfied Customers Really Pay More? A Study of the Relationship Between Customer Satisfaction and Willingness to Pay

Two experimental studies (a lab experiment and a study involving a real usage experience over time) reveal the existence of a strong, positive impact of customer satisfaction on willingness to pay, and they provide support for a nonlinear, functional structure based on disappointment theory (i.e., an inverse S-shaped form). In addition, the second study examines dynamic aspects of the relationship and provides evidence for the stronger impact of cumulative satisfaction rather than of transaction-specific satisfaction on willingness to pay.

Customer satisfaction (CS) has become an important focus of corporate strategy. In the past, many executives trusted their intuitive sense that higher CS would lead to improved company performance. Thus, many companies have implemented programs for measuring and improving CS.

Recent research supports the notion that there is a positive relationship between CS and financial performance (e.g., Anderson, Fornell, and Rust 1997; Reichheld and Sasser 1990; Rust and Zahorik 1993). In an important study, Anderson, Fornell, and Lehmann (1994, p. 63) analyze this link on data obtained from the Swedish Customer Satisfaction Index, and they find that "firms that actually achieve high customer satisfaction also enjoy superior economic returns."

However, the understanding of the constructs that mediate the link between CS and firm profitability is still limited (Szymanski and Henard 2001). The studies that exist find that higher levels of CS lead to greater customer loyalty (e.g., Anderson and Sullivan 1993; Bearden and Teel 1983; Bolton and Drew 1991a, b; Fornell 1992; LaBarbera and Mazursky 1983; Oliver 1980; Oliver and Swan 1989a, b), which in turn has a positive impact on profitability (Reichheld and Teal 1996). Other studies find that satisfied customers can increase profitability by providing new referrals through positive word of mouth (e.g., Mooradian and Olver 1997).

A notable question is whether CS also affects the customer's willingness to pay (WTP) for the product or service. This relationship is important because price is a key element in the profit equation and therefore is directly linked to profitability. Furthermore, the general belief that satisfied customers are willing to pay higher prices is typically based on anecdotal evidence (e.g., Finkelman 1993; Reichheld and Sasser 1990).

Despite the importance of this issue, price-related outcomes of CS (and WTP) have often been neglected in previous research (Anderson 1996). To our knowledge, only one study (Anderson 1996) focuses on the link between CS and price tolerance (the maximum price customers are willing to pay or tolerate before switching), and it reports mixed results with respect to the assumed linear link between the two variables at the company level.

Our research follows Anderson's (1996) and Gotlieb, Grewal, and Brown's (1994) suggestions that research needs to test links between CS and price-related constructs in controlled settings in which the variables are manipulated. In this study, we explore the link between CS and WTP in two experimental studies, and we focus on three research questions.

First, we examine whether there is a (positive) relationship between CS and WTP at the individual level. The WTP concept has not been investigated in this context in previous research. In the theoretical domain, answering this research question provides an improved understanding of the link between CS and profitability. From a manager's perspective, providing an answer to this question can have important implications for pricing practices.

Second, we study the functional structure of the relationship between CS and WTP. In this context, it is worthwhile to determine whether the relationship (if it exists) is essentially linear or whether there are significant nonlinear

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Christian Homburg is Professor of Business Administration and Marketing and Chairman of the Department of Marketing (e-mail: prof.homburg@bwl.uni-mannheim.de), and Nicole Koschate is Assistant Professor of Marketing (e-mail: nicole.koschate@bwl.uni-mannheim.de), University of Mannheim, Germany. Wayne D. Hoyer is James L. Bayless/William S. Farish Fund Chair for Free Enterprise and Chairman of the Department of Marketing, McCombs School of Business, University of Texas at Austin (e-mail: wayne.hoyer@mccombs.utexas.edu). The authors thank the Deutsche Forschungsgemeinschaft, Sonderforschungsbereich 504, for financial support.

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effects Understanding the functional structure of this relationship is important for managers to determine an aspired level of CS This research question is in line with the increasing interest in more complex functional structures of the links in the satisfaction–profit chain (Anderson and Mittal 2000) However, as Ngobo (1999) notes, there has been a lack of a theoretical foundation in the examination of nonlinear effects between CS and behavioral outcome variables Therefore, in this article, we provide theoretical developments and reasoning for two alternative functional structures for the relationship between CS and WTP as well as a strong empirical test of these notions

Third, current research indicates the importance of studying dynamic aspects in the link between CS and outcome variables (Bolton 1998, Bolton and Lemon 1999) Thus, we investigate how the relationship between CS and WTP changes over time To our knowledge, this has not been examined in prior research

Hypotheses Development

Definitions of Constructs

Because a key focus of this article is to examine how CS affects the customer's WTP, it is important first to define the terms "Satisfaction" is the result of a postconsumption or postusage evaluation, containing both cognitive and affective elements (Oliver 1997) According to the expectancy–disconfirmation paradigm (Oliver 1980), customers judge satisfaction by comparing previously held expectations with perceived product or service performance In addition, affect (positive or negative), which arises from the cognitive process of confirmation/disconfirmation, contributes to (dis)satisfaction (Oliver 1993, Oliver, Rust, and Varki 1997)

In this research, we concentrate on satisfaction with "performance," which is a postconsumption evaluation of perceived quality relative to prepurchase performance expectations about quality (e g , Anderson 1994, Anderson and Sullivan 1993, Bitner 1990, Churchill and Surprenant 1982, Oliver 1980, Oliver and DeSarbo 1988, Tse and Wilton 1988) Under this conceptualization, price is not included as part of the satisfaction judgment

With respect to dynamic aspects, the literature differentiates between "transaction-specific satisfaction" and "cumulative satisfaction" Transaction-specific satisfaction is a customer's evaluation of his or her experience with and reactions to a particular product transaction, episode, or service encounter (Olsen and Johnson 2003), and cumulative satisfaction refers to the customer's overall evaluation of a product or service provider to date (Johnson, Anderson, and Fornell 1995)

The WTP is the maximum amount of money a customer is willing to spend for a product or service (Cameron and James 1987, Krishna 1991) Economists refer to WTP as the reservation price (Monroe 1990) Thus, WTP is a measure of the value that a person assigns to a consumption or usage experience in monetary units It has been studied in the marketing literature, including such areas as advertising (Kalra and Goodstein 1998), consumer dealing patterns (Krishna 1991), and pre–test markets (Cameron and James 1987)

Impact of CS on WTP

To justify theoretically the nature of the relationship between CS and WTP, we turn to equity theory, which focuses on fairness in social exchange (Adams 1965, Homans 1961, Oliver and Swan 1989a, b) In the context of the current study, the exchange involves the customer receiving a specific level of satisfaction and the seller receiving an agreed-on payment (Lind and Tyler 1988) Equity theory suggests that parties to an exchange perceive equitable treatment if the ratio of their outcomes to inputs is in some sense fair (distributive justice) Both positive and negative inequity produce negative affective states that motivate people to change parameters of the exchange to reestablish equity For example, Bolton and Lemon (1999) find that customers try to maintain payment equity over time by adjusting items under their control (in this case, usage levels) in response to changes made by the company (e g , price changes, changes in service quality)

When customers experience elevated states of satisfaction, they perceive a high outcome of an exchange and therefore are willing to pay more (i e , more than less satisfied customers) because this still results in an equitable ratio of outcome to input This is one way to maintain payment equity (Bolton and Lemon 1999) Similarly, when satisfaction is low, customers perceive a low payment as adequate to establish a fair exchange Thus, WTP should be lower in cases of low satisfaction than in cases of high satisfaction This leads to the following hypothesis

> H_1 The price that customers are willing to pay increases with the level of CS

Functional Structure of the Relationship

Most current research addresses nonlinear effects of antecedents on CS rather than on outcomes of satisfaction (which is the focus of this study) (Anderson and Mittal 2000, Mittal, Ross, and Baldasare 1998, Oliver 1995) For example, Mittal, Ross, and Baldasare (1998) examine nonlinear effects of attribute performance on CS and find support for an S-shaped function, which is steep in the middle and flat at the extremes

There are only a few studies that find empirical evidence for nonlinear effects in the satisfaction–outcome link (with dependent variables such as customer loyalty and complaining behavior) Among the studies that examine CS and customer loyalty, there is no consensus about the functional structure for this specific relationship For example, for the satisfaction–retention link, Mittal and Kamakura (2001) find nonlinear effects in the form of increasing returns On the basis of anecdotal evidence, Coyne (1989) and Finkelman (1993) argue for an inverse S-shaped function, which is flat in the middle and steep at the extremes Oliva, Oliver, and MacMillan (1992) find a similar functional structure in their study based on a catastrophe model Ngobo (1999) predicts an opposite functional structure, which is steep in the middle and flat at the extremes, and finds partial empirical support for this function Singh and

Pandya (1991) investigate the link between dissatisfaction and various dimensions of complaining behavior and find different nonlinear patterns for the dimensions However, all the aforementioned studies investigate other behavioral outcomes of CS and not the WTP construct, which is the focus of this study

In hypothesizing about the functional structure, two viewpoints are the most relevant The first focuses on disappointment theory (Loomes and Sudgen 1986) and on emotions in the CS experience (Oliver 1993, Oliver, Rust, and Varki 1997), and the second draws on prospect theory With respect to disappointment theory, there is empirical evidence in the literature that high positive and high negative disconfirmation are much more emotionally charged than is confirmation Although positive disconfirmation results in emotions such as delight and elation (Oliver, Rust, and Varki 1997, Rust and Oliver 2000), negative disconfirmation leads to the emotion of disappointment (Oliver and DeSarbo 1988, Oliver and Westbrook 1993, Westbrook and Oliver 1991) In contrast, mere confirmation adds almost no emotional content to a consumption or usage experience (Oliver 1997) This state has also been described as "cool satisfaction" (Woodruff, Cadotte, and Jenkins 1983)

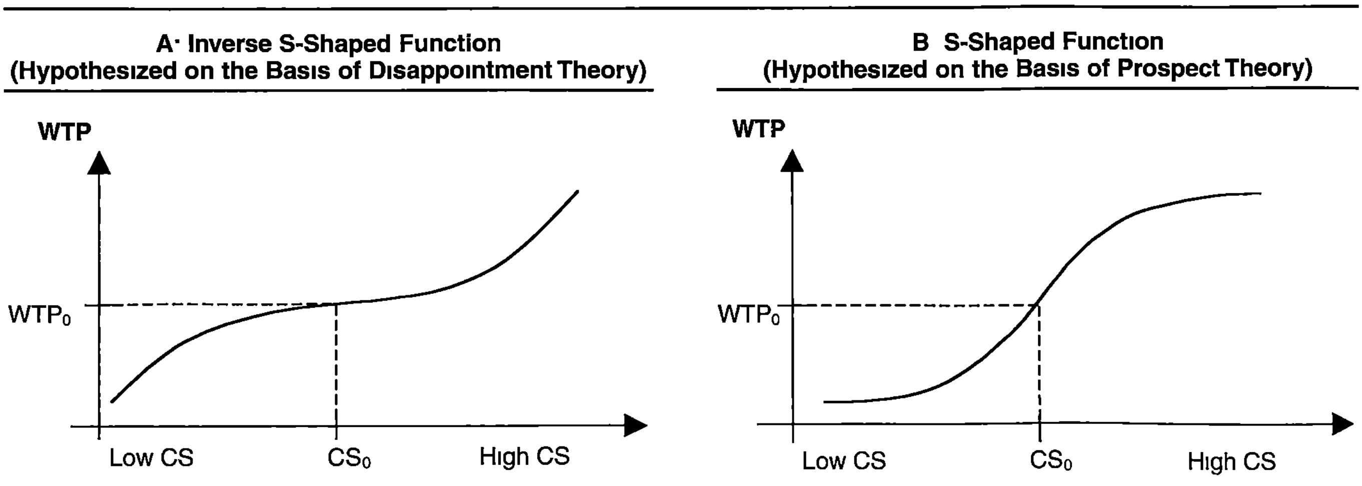
Disappointment theory, which is rooted in the field of behavioral decision theory, incorporates the emotions of disappointment and elation into the utility formula (Bell 1985, Inman, Dyer, and Jia 1997, Loomes and Sudgen 1986) This theory suggests that disappointment occurs when the outcome of a choice is below prior expectations, whereas elation arises when the outcome of a choice exceeds prior expectations The greater the disparity between outcome and expectations, the greater is a person's disappointment or elation The theory assumes that both emotions generate additional value (negative or positive) to the basic value of the consumption or usage experience from the process of confirmation/disconfirmation More specifically, elation (disappointment) should generate an increment (decrement) of value A crucial aspect of this theory is that both emotion values should increase to a greater degree at the margins, which leads to a convex shape for elation values and a concave shape foi disappointment values (Loomes and Sudgen 1986)

Building on these research areas, we hypothesize about the structural relationship between CS and WTP In the following discussion, CS_0 denotes the satisfaction level that is achieved if customer expectations are exactly met, WTP_0 denotes the WTP that is present if CS equals CS_0 As we argued in the justification of H_1, satisfaction influences a customer's WTP positively However, as we mentioned previously, simple confirmation does not add much emotion to the consumption or usage experience Therefore, near CS_0, the functional structure will be relatively flat Moving away from CS_0, the two research streams mentioned previously suggest that the magnitude of changes in WTP produced by changes in satisfaction level increases substantially as the result of elation or disappointment In other words, the function relating CS to WTP is convex for satisfaction levels above CS_0 and concave for satisfaction levels below CS_0 (see Figure 1, Panel A) It is possible that diminishing returns to delight/disappointment occurred at some point (i e , it is unlikely that there is an infinite WTP for extreme levels of delight) However, it seems that extreme levels of delight are unlikely to be reached for most products or services This reasoning leads to the following hypothesis

> H_2 The relationship between CS and the price that customers are willing to pay follows an inverse S-shaped function, which is first concave and then convex

The second viewpoint draws on prospect theory (Kahneman and Tversky 1979) and proposes an opposite functional structure, which is steep in the middle and flat at the extremes In the application of this theory, there are two important aspects First, the judgment of satisfaction would be reference dependent In this case, the reference point is the expected satisfaction level (CS_0 in Figure 1, Panel B) Satisfaction above the reference point ($CS > CS_0$) would be considered a gain, whereas satisfaction below this standard of comparison would be perceived as a loss ($CS < CS_0$)

FIGURE 1
Alternative Functional Structures for the Relationship Between CS and WTP



A· Inverse S-Shaped Function (Hypothesized on the Basis of Disappointment Theory)

B S-Shaped Function (Hypothesized on the Basis of Prospect Theory)

Second, evaluations of satisfaction would display diminishing sensitivity That is, marginal values of gains and losses decrease in size with increasing levels of satisfaction or dissatisfaction [1] This functional structure is steep in the middle and flat at the margins (see Figure 1, Panel B), Ngobo (1999) suggests this for the CS–loyalty link This leads to the following alternative hypothesis

> H_{2alt} The relationship between CS and the price that customers are willing to pay follows an S-shaped function, which is first convex and then concave

Transaction-Specific Versus Cumulative Satisfaction

This study also examines how the nature of the relationship between CS and outcome variables can evolve over time (Bolton 1998, Bolton and Lemon 1999) More specifically, satisfaction, which is based on repeated experiences (i e , cumulative satisfaction), should have a stronger impact on outcome variables than should satisfaction with a single consumption experience (Anderson, Fornell, and Rust 1997, Olsen and Johnson 2003, Rust, Zahorik, and Keiningham 1995) This study extends previous work that compares cumulative satisfaction with transaction-specific satisfaction by investigating a new dependent variable (i e , WTP) and by considering nonlinear effects

To support the notion that the relationship between CS and WTP changes over time, we draw on research on the attitude–behavior link A meta-analysis on this link indicates that attitude certainty moderates the relationship between the two variables The higher the attitude certainty, the stronger is the relationship (Kraus 1995) With respect to the current study, we propose that attitude certainty (i e , certainty with the satisfaction judgment) is stronger for cumulative satisfaction than for transaction-specific satisfaction because customers have had more opportunities to validate their judgment Additional theoretical support is provided by the Bayesian information updating approach, which Boulding, Kalra, and Staelin (1999) and Rust et al (1999) use to justify dynamic effects This leads to the following hypothesis

> H_3 The more the CS judgment moves from transaction-specific to cumulative, the stronger is the relationship between CS and WTP

We now present two experimental studies Study 1 examines how different levels of CS increase the WTP (H_1, H_2, and H_{2alt}) in a lab experiment, and Study 2 extends the research to a real consumption experience and captures the dynamic aspects (i e , cumulative satisfaction) of the situation (H_1–H_3)

Study 1: Methodology

Research Design

In the first experimental study, participants evaluated written scenarios that were set in a restaurant context To induce different levels of CS, we established expectations about the restaurant (which we held constant) and then manipulated the actual experience with the restaurant The expectations were set up in the introductory section The restaurant was described as an upscale Italian restaurant that offered one three-course menu To enhance the realism of the experiment, participants needed to choose among three options for each course, the price of the menu was independent from the actual choice of the participant Furthermore, participants were told to imagine that they were going out for dinner with a friend

The manipulation of the actual experience was analogous to a conjoint design (similar to the approach that Smith, Bolton, and Wagner [1999] adopt) We selected three key attributes of the restaurant quality of food, ambience, and service (Bernhardt, Donthu, and Kennett 2000) Each attribute was varied at two levels (for the complete wording, see Table 1), resulting in eight different scenarios, which we applied as a within-subjects design We randomized the order of the attributes across the scenarios

Sample Design and Experimental Procedure

The sample comprised 80 students from various majors at a major German university The experiment consisted of ten sections The first section included the introduction in which the expectations were set Each of eight subsequent sections contained a different satisfaction condition that manipulated the experience with the restaurant The order of the satisfaction scenarios was completely randomized across participants After reading a scenario, participants responded to measures of their WTP Note that we measured WTP after the restaurant experience, not before Then, there was an intervening story, which we designed to distract the participants from thinking about price to thinking about the original restaurant experience We then measured satisfaction with the restaurant experience After all eight scenarios had been evaluated, there was a final set of general questions

Measurement of Variables

We assessed CS using a four-item measure that closely parallels previous approaches to measuring CS (e g , Anderson and Sullivan 1993, Bearden and Teel 1983, Churchill and Surprenant 1982, Fornell et al 1996) [2] The satisfaction scale had excellent internal consistency, with a composite

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[1] Prospect theory also emphasizes loss aversion, which results in an asymmetric functional structure More specifically, the theory assumes a function that is steeper for losses than for gains Such asymmetric effects are beyond the scope of this study, and therefore we do not consider them

[2] We measured satisfaction with the following items "All in all, I would be satisfied with this restaurant", "The restaurant would meet my expectations", "The earlier scenario compares to an ideal restaurant experience", and "Overall, how satisfied would you be with the restaurant visit just described?" We measured the items on an 11-point Likert-type scale For the first three items, the scale ranged from "strongly agree" to "strongly disagree," and for the last item, the scale ranged from "very satisfied" to "very dissatisfied "

TABLE 1
Study 1: CS Manipulation

Attributes	Dimensions	Favorable	Unfavorable
Quality of food	Taste, freshness, preparation	The food is excellent All ingredients are fresh The combination of the food is creative, and the preparation is exquisite	Several ingredients are not that fresh The combination of the food/dishes is interesting, but some of them are too spicy The food's quality is medium
Ambience	Interior design, loudness, temperature	The interior design is neat and elegant The noise level is low, and you are able to talk in peace The temperature is pleasant	The interior design is simple The noise level is high, and it is sometimes quite turbulent It is too cool in the restaurant, and that is why you are freezing
Service	Timing, friendliness, competence	The servers give you competent advice about the available food and beverages The period of time between the courses is just right The service is very friendly and courteous throughout the evening	The period of time between the courses is too long The service is somewhat rude throughout the evening Moreover, the servers give you insufficient advice about the available food and beverages

TABLE 2
Study 1: Means (Standard Deviations) of CS and WTP Measures for the Eight Scenarios

	Attributes				
Scenario	Quality of Food	Ambience	Service	CS	WTP[a]
1	–	–	–	1 35 (67)	22 67 (12 87)
2	–	–	+	3 36 (1 55)	31 40 (12 96)
3	–	+	–	3 37 (1 88)	32 91 (14 28)
4	+	–	–	4 75 (2 05)	35 20 (14 75)
5	–	+	+	5 89 (2 28)	37 64 (14 09)
6	+	–	+	7 05 (2 20)	41 90 (16 83)
7	+	+	–	7 72 (1 95)	43 90 (16 18)
8	+	+	+	10 77 (53)	54 71 (19 92)

[a]WTP is measured in German marks
Notes + = favorable attribute, – = unfavorable attribute

reliability (Fornell and Larcker 1981) of 98, which exceeds Bagozzi and Yi's (1988) suggested threshold value of 6 For further analysis, we calculated the satisfaction score as the average of the four satisfaction scale items Table 2 shows the means of the satisfaction measures for all scenarios

We measured WTP with an open-ended question Participants were asked the price that they would be willing to pay for the restaurant visit This type of measure has been widely used in other studies in this area (e g , Cameron and James 1987, Krishna 1991) Table 2 provides the means of the WTP measures for the eight scenarios

Study 1: Results

Hypotheses Testing

First, H_1 predicts a positive relationship between CS and WTP We tested the hypothesis with the following random coefficient regression model, which controls for participants' effects [3]

$$\text{(1)} \qquad WTP_{ij} = b_0 + b_1CS_{ij} + u_j + r_{ij},$$

where WTP_{ij} is the WTP of the jth individual on the ith scenario, and CS_{ij} is the CS of the jth individual on the ith scenario The individual intercepts are expressed as the sum of an overall mean (b_0) and a series of random deviations from that mean (u_j) The slope is modeled as a constant (b_1) across all people, and r_{ij} is the random error associated with the ith scenario of the jth individual The model has two fixed effects (an intercept [b_0] and a slope [b_1] effect for CS) and two random effects (one for the intercepts [registered by the u_j with variance τ^2] and one for the observations of individuals [registered by the r_{ij} with variance σ^2])[4]

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[3]For this type of regression, see Cohen and colleagues (2003) and Snijders and Bosker (1999)

We estimated the model with the maximum likelihood method using the procedure MIXED in SAS 8 02[5] The estimation results appear on the left-hand side of Table 3 Note that b_1 is positive and significantly different from zero (b_1 = 2 839, $p <$ 0001) This indicates a statistically significant and positive relationship between CS and WTP and confirms H_1 that satisfied customers are willing to pay more for the product or service

Because the same manipulation drives both satisfaction and WTP, it is important to demonstrate that satisfaction mediates the relationship between service quality and WTP The results of a mediation analysis (Baron and Kenny 1986) provide support for the mediating role of satisfaction[6]

Our second analysis pertained to the functional structure of the relationship between CS and WTP H_2 proposes an inverse S-shaped function, whereas H_{2alt} suggests an S-shaped function We tested the hypotheses with the following cubic random coefficient regression model

$$WTP_{ij} = b_0 + b_1CS_{ij} + b_2CS_{ij}^2 + b_3CS_{ij}^3 + u_j + r_{ij} \tag{2}$$

The model has four fixed effects (an intercept [b_0] and three slope parameters [b_1, b_2, b_3] for CS) and two random effects (one for the intercepts [registered by the u_j with variance τ^2] and one for the observations of individuals [registered by the r_{ij} with variance σ^2])

To control for multicollinearity associated with a cubic regression model, we used orthogonal polynomial variables as predictor variables (Kleinbaum et al 1998, p 293)[7] The right-hand side of Table 3 shows the estimation results Most important, the coefficient b_3 is positive and significant (b_3 = 42 868, $p <$ 0001), which implies that the effect of CS on WTP increases at the margins This supports H_2, which states that the relationship between CS and WTP is best described with an inverse S-shaped function However, the results contradict the prediction of H_{2alt}, which proposes an S-shaped function

Furthermore, the cubic model contributes significantly more to the explanation of WTP than does the linear model, which is indicated by a hierarchical likelihood ratio chi-square test[8] The null hypothesis—that the additional pre-

TABLE 3
Study 1: Results of Random Coefficient Regression Models

		Linear Model			Cubic Model[a]		
–2 Log Likelihood		4519 8			4479 7		
		Solutions for Fixed Effects					
Parameter	**Effect**	**Estimate**	**t-value**	***p***	**Estimate**	**t-value**	***p***
b_0	Intercept	37 541	24 190	000	37 541	24 250	000
b_1	CS	2 839	34 530	000	234 590	35 470	000
b_2	CS^2				–1 827	– 270	785
b_3	CS^3				42 868	6 440	000
		Solutions for Random Effects					
Parameter		**Estimate**	**Z-value**	***p***	**Estimate**	**Z-value**	***p***
τ^2 (variance of u_j)		187 220	6 140	000	186 580	6 160	000
σ^2 (variance of r_{ij})		43 780	16 730	000	40 787	16 730	000

[a] The results are based on orthogonal polynomials

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[4] Both error terms are assumed to be uncorrelated, normally distributed, and constant and to have a mean zero

[5] We used the maximum likelihood method because the focus of the analysis is on deviance tests and not on the random part parameters for which the restricted maximum likelihood method is preferable (Snijders and Bosker 1999)

[6] To test the mediation, we estimated three regression equations First, we regressed the mediator, CS, on quality, this showed a significant effect (b_{qual} = 821, t = 36 366, $p <$ 0001) Second, we regressed the dependent variable, WTP, on quality, this also showed a significant effect (b_{qual} = 489, t = 14 155, $p <$ 0001) Third, we regressed WTP on both quality and CS The third equation demonstrated that when CS was included with quality in the regression analysis, CS was highly significant (b_{sat} = 346, t = 5 860, $p <$ 0001) The effect of quality remained significant (b_{qual} = 205, t = 3 470, $p <$ 001), but the effect was much smaller than it was in the second equation Thus, CS partially mediated the effect of quality on WTP

[7] Orthogonal polynomial variables are linear combinations of the simple polynomials and are pairwise uncorrelated, which completely eliminates any collinearity We calculated the orthogonal polynomial variables with the ORPOL function, using the interactive matrix language in SAS 8 02

[8] The hierarchical likelihood ratio chi-square test is performed analogously to the multiple-partial F test in ordinary least squares regression (Kleinbaum et al 1998, p 650) This test compares two nested models The null hypothesis states that the contribution of the additional predictors of the more complex model (i e , the cubic model) does not exceed the contribution of the predictors of the simpler model (i e , the linear model) Here, the hierarchical likelihood ratio test with 2 degrees of freedom is 4519 8 – 4479 7 = 40 1

dictors of the cubic model do not exceed the contribution of the linear model—can be rejected ($p < .001$). Therefore, the cubic model significantly improves prediction. In addition, we compared the fit of the models using Akaike's information criterion (AIC statistic) of model evaluation (Akaike 1974; Homburg 1991). The results support the cubic model because the corresponding AIC value (4491.7) is smaller than that of the linear model (4527.8). Using the Schwarz Bayesian information criterion (BIC; Burnham and Anderson 2002; Schwarz 1978) instead of the AIC leads to similar conclusions (the BIC cubic model is 4506.0, which is less than the BIC linear model value of 4537.3). This supports the results we obtained with the likelihood ratio test statistic.

Overall, the findings support H_2 (see Figure 2). The function is concave for low satisfaction levels and convex for high satisfaction levels; there is an inflection point at which the function switches from concave to convex.

We now turn to Study 2, which extends the investigation in three important aspects. First, Study 2 uses the context of a real consumption/usage experience, and it uses a behavioral outcome variable. Second, it captures the dynamic aspects of the relationship between CS and WTP (H_3). Third, it investigates the hypotheses in a product setting, whereas Study 1 investigates the hypotheses in a service setting.

Study 2: Methodology

Study Overview

We designed Study 2 around the evaluation of a newly created product—a CD-ROM tutorial—which could be used to provide academic assistance in a difficult pricing class and which the customers (students who were taking the pricing class) could actually buy. We gave participants three sample chapters (trials) of the CD-ROM tutorial over time in a computer-based format, and we asked them to solve a sample pricing problem that was related to the sample chapter. We then provided performance feedback on the pricing problem and obtained key measures.

Research Design

Study 2 used an 8 (levels of satisfaction) × 3 (trial) full factorial design. Satisfaction was a between-subjects factor, and trial was a within-subjects factor. First, to manipulate CS, we established expectations about the CD-ROM tutorial (which we held constant across the experimental conditions). In the introductory section of Study 2, the purpose of the study guide was described (i.e., to help course participants understand difficult material in the class), and an overview of the content was provided. Participants were informed that the CD-ROM tutorial contained 73 chapters, which would be similar to the ones they received in the testing phase but would cover different pricing topics.

Second, we manipulated the actual consumption experience. Participants were given a sample chapter and were asked to solve a related pricing problem. To manipulate a high satisfaction evaluation, the content of the CD-ROM sample chapter made it easy to understand and to solve the pricing problem. Furthermore, participants received positive feedback on the pricing task after a team of the instructor's assistants checked their solutions. To manipulate a low satisfaction evaluation, the content of the CD-ROM chapter was difficult to read and provided almost no information related to the pricing problem. In addition, the participants received negative performance feedback.

To create different degrees of cumulative satisfaction, which makes it possible to examine the dynamic relationship between satisfaction and WTP (H_3), we manipulated satisfaction across three different trials. This involved presenting participants with three different chapters from the CD-ROM tutorial and solving three different pricing problems over time. Table 4 outlines the eight different conditions.

FIGURE 2
Study 1: Empirical Relationship Between CS and WTP

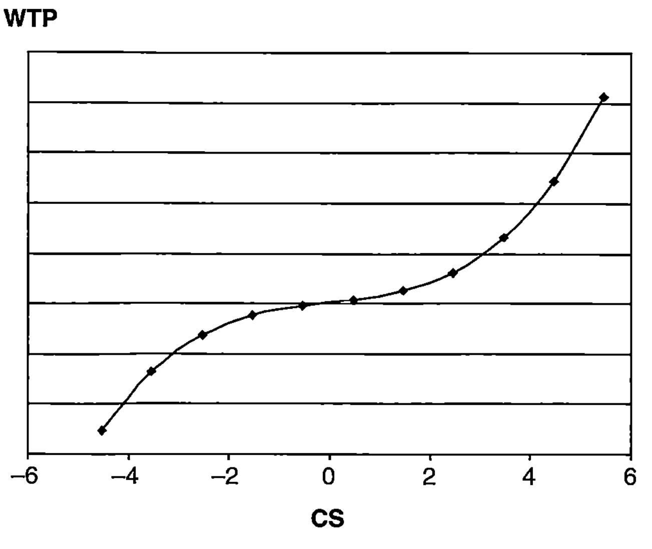

TABLE 4
Study 2: Manipulation of CS Across Three Trials

Experimental Condition	1	2	3
1	High	High	High
2	High	High	Low
3	High	Low	High
4	High	Low	Low
5	Low	High	High
6	Low	High	Low
7	Low	Low	High
8	Low	Low	Low

Sample Design and Experimental Procedure

The sample consisted of 157 marketing students who were enrolled in a graduate-level pricing class at a large German university. This is an appropriate sample given the nature of the product that was being evaluated. Participants were aware that previous students had experienced difficulties in this pricing class. To address this problem, they were told that a CD-ROM study guide had been developed to assist participants in solving difficult pricing problems in the course. Furthermore, they would have the chance to test the CD-ROM tutorial before deciding whether they wanted to buy it.

Before the first trial, participants were given the introductory section of the CD-ROM, which set up the expectations (purpose and content of the CD-ROM). Then, they received one sample chapter of the CD-ROM study guide (first trial), after which they solved a problem related to the material. We manipulated satisfaction in the manner previously described and then measured the key variables (WTP and then CS). We obtained WTP as a behavioral outcome variable by way of Becker, DeGroot, and Marschak's (1964) mechanism (hereinafter BDM, see also Wertenbroch and Skiera 2002), which we describe in the next section. In addition, participants were committed to pay their own money. Furthermore, participants were asked intervening questions to distract them from the evaluation situation, after which we measured CS. This was followed by an additional intervening task in which participants read a newspaper article about a recent pricing problem in practice and were asked to answer some open-ended questions about the content of the article. The procedure for the second and third trial was analogous to that of the first trial.

Measurement of Variables

We measured CS with the four items from Study 1 and with two additional emotion items (elation and disappointment). The internal consistency of the satisfaction scale was excellent across the three trials (Cronbach's $\alpha = .94$ [first trial], .96 [second trial], and .96 [third trial]). Thus, for further analyses, we calculated the satisfaction scores as the means of the satisfaction scale items.

We obtained the key dependent variable, WTP, using the BDM method as Wertenbroch and Skiera (2002) suggest. The advantages of the BDM method are that it is incentive compatible (i.e., customers have an incentive to reveal their WTP truthfully), realistic, transparent to respondents, and operationally efficient. In our study, participants were told that they would have a chance to purchase the CD-ROM tutorial without needing to invest more money than they were willing to pay. After using the CD-ROM tutorial and receiving feedback, participants were asked to indicate a price for the CD-ROM, which should equal the highest price they were willing to pay for the CD-ROM in each trial. They were told that the price for the CD-ROM tutorial was not yet set and that it would be determined randomly from a prespecified distribution after the testing phase of the CD-ROM tutorial. If the randomly determined price was less than or equal to the participant's bid, the participant was obligated to buy the CD-ROM tutorial at the randomly determined price. However, if the randomly determined price was higher than their bid, they would not have a chance to buy the product. This mechanism ensures that participants had no incentive to indicate a price that is higher or lower than their true WTP.

In addition, we collected several variables as possible covariates: age, sex, income, budget for studying material, perceived pressure to buy the CD-ROM tutorial, price consciousness, value consciousness, and self-confidence. Analyses indicate that none of the variables had any effect as covariates. Thus, we dropped them from further analysis.

Study 2: Results

We tested H_1, H_2, and H_{2alt} with random coefficient regression models that were analogous to those in Study 1. The analyses were based on the data from the third trial (in which satisfaction is the most cumulative). Thus, we did not consider a random intercepts effect (u_j). The results provide strong support for H_1 and H_2 (see the right-hand side of Table 5). First, in a linear model, there is a positive and statistically significant relationship between CS and WTP ($b_1 = 1.201$, $p < .0001$). Second, in the cubic model, the coefficient b_3 was positive and significant ($b_3 = 11.706$, $p < .05$), in support of H_2.[9] However, the results contradict H_{2alt}, which proposes an S-shaped function with decreasing returns at the margins.

Furthermore, the cubic model contributes significantly more to the explanation of WTP than does the linear model, which is evidenced by a hierarchical likelihood ratio chi-square test ($p < .05$). In line with this is the result of the AIC, which is smaller for the cubic model (918.3) than for the linear model (921.4). In summary, the cubic model is significantly stronger in the prediction of WTP than is the linear model. The results provide strong support for the predicted inverse S-shaped function, which we propose in H_2. It is only the BIC that does not provide support for the superiority of the cubic model (938.6) over the linear model (935.6). Overall, however, we believe that there is reasonable support for the inverse S-shaped function, because the rigid statistical likelihood ratio test indicates that the cubic model should be favored over the linear model.[10]

As in Study 1, we conducted a mediation analysis, which indicated that CS completely mediated the relationship between quality and WTP.[11] H_3 predicts that as the CS

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[9] The estimation was based on orthogonal polynomial variables, which eliminate the problem of multicollinearity in the cubic regression model.

[10] Many researchers have argued that in the case of nested models, model comparison should be based on the likelihood ratio test and that information criteria should be used in the case of nonnested models (Cohen et al. 2003; Kleinbaum et al. 1998). Because the two models we consider are nested, the result of the likelihood ratio test should be given the strongest emphasis.

[11] The first regression analysis showed a significant effect of quality on WTP ($b_{qual} = .485$, $t = 6.855$, $p < .0001$). The second regression indicated a significant effect of quality on CS ($b_{qual} =$

TABLE 5
Study 2: Results of Random Coefficient Regression Models Across Trials

		WTP Trial 1			WTP Trial 2			WTP Trial 3		
		A: Linear Model								
–2 Log Likelihood		940 9			916 2			915 4		
		Solutions for Fixed Effects								
Parameter	**Effect**	**Estimate**	**t-value**	***p***	**Estimate**	**t-value**	***p***	**Estimate**	**t-value**	***p***
b_0	Intercept	2 902	2 320	022	2 326	2 120	036	1 426	1 360	177
b_1	CS	999	5 190	000	1 030	6 020	000	1 201	6 990	000
		Solutions for Random Effects								
Parameter		**Estimate**	**Z-value**	***p***	**Estimate**	**Z-value**	***p***	**Estimate**	**Z-value**	***p***
σ^2 (variance of r_{ij})		25 323	8 800	000	22 454	8 770	000	21 490	8 800	000
		B: Cubic Model[a]								
–2 Log Likelihood		939 1			910 5			908 3		
		Solutions for Fixed Effects								
Parameter	**Effect**	**Estimate**	**t-value**	***p***	**Estimate**	**t-value**	***p***	**Estimate**	**t-value**	***p***
b_0	Intercept	9 044	22 500	000	8 515	22 720	000	8 296	22 790	000
b_1	CS	26 144	5 220	000	28 538	6 120	000	32 412	7 140	000
b_2	CS^2	–3 045	– 610	545	6 375	1 360	175	3 533	780	438
b_3	CS^3	5 873	1 170	244	9 335	2 000	047	11 706	2 580	011
		Solutions for Random Effect								
Parameter		**Estimate**	**Z-value**	***p***	**Estimate**	**Z-value**	***p***	**Estimate**	**Z-value**	***p***
σ^2 (variance of r_{ij})		25 042	8 800	000	21 634	8 770	000	20 532	8 800	000

[a]The results are based on orthogonal polynomials

judgment moves from transaction-specific to cumulative, the impact on WTP is strengthened Satisfaction becomes more cumulative across the three trials as participants gain more experience with the CD-ROM tutorial As we show in Table 5, the parameter for the cubic effect becomes stronger over the three trials However, a statistical test of H_3 involves an examination of the interaction between CS and trial in the pooled model We tested H_3 with two random coefficient regression models one for the linear and one for the cubic case The first model tests H_3 on the basis of a linear relationship between CS and WTP

$$(3)\ WTP_{ij} = b_0 + b_1CS_{ij} + b_2TRIAL_i + b_3CS_{ij}TRIAL_i + u_j + r_{ij}$$

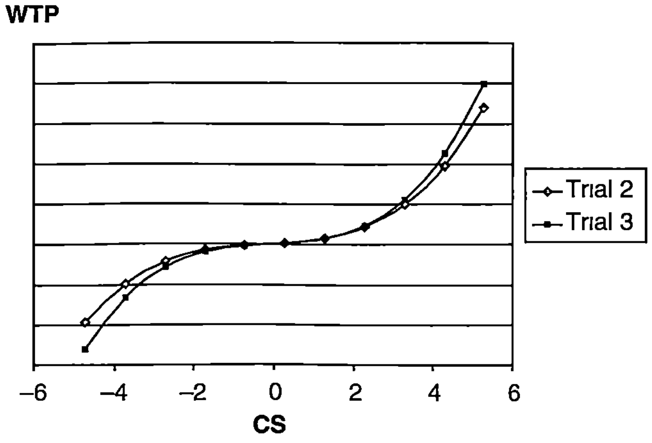
The model has four fixed (b_0, b_1, b_2, and b_3) and two random (u_j and r_{ij}) effects The significant and positive interaction between CS and TRIAL ($b_3 = 076$, $p < 05$) provides empirical evidence that the slopes for CS increase substantially across trials We then tested H_3 on the basis of a cubic relationship between CS and WTP

$$(4)\ WTP_{ij} = b_0 + b_1CS_{ij} + b_2TRIAL_i + b_3CS_{ij}TRIAL_i + b_4CS^2_{ij} + b_5CS^2_{ij}TRIAL_i + b_6CS^3_{ij} + b_7CS^3_{ij}TRIAL_i + u_j + r_{ij}$$

The analysis was based on orthogonal polynomials and provides additional support for H_3 Most important, the interaction between the cubic term of CS and trial is positive and significant ($b_7 = 2\ 491$, $p < 05$) This provides empirical evidence that the nonlinear effect of CS on WTP is more pronounced in later trials Figure 3 shows the graphs of the estimated cubic regression models in the second and the third trial (results for the first trial were not significant) The results support H_3

843, $t = 19\ 511$, $p < 0001$) The third equation, in which WTP was regressed on CS in addition to quality, showed that CS was significant ($b_{sat} = 279$, $t = 2\ 145$, $p < 05$), whereas the initially highly significant predictive ability of quality was eliminated ($b_{qual} = 249$, $t = 1\ 911$, $p = 058$) Thus, CS mediated the link between quality and WTP

FIGURE 3
Study 2: Empirical Relationship Between CS and WTP



Discussion

Research Issues

The first objective of our study was to examine whether there is a (positive) relationship between CS and WTP. The findings reveal strong support for such an effect. It is worthwhile to compare the results of the present study with those from Bolton and Lemon's (1999) research, which focuses on the concept of "payment equity." Their findings suggest that customers try to maintain payment equity over time by adjusting items under their control (in this case, usage levels) in response to changes made by the company (e.g., price changes, changes in service quality). Our study extends Bolton and Lemon's work by identifying another aspect that the customer can use to restore equity—namely, WTP. Both of the studies illustrate the usefulness of equity theory in understanding the relationship between pricing issues and satisfaction.

The second objective of our study was to investigate the functional structure of the relationship between CS and WTP. The findings provide support for the function that research on emotions in the CS experience and disappointment theory predicts (Bell 1985; Loomes and Sudgen 1986; Oliver, Rust, and Varki 1997; Rust and Oliver 2000), which suggests that the functional structure should have an inverse S-shaped form that is concave for low satisfaction levels, convex for high satisfaction levels, and relatively flat for medium satisfaction levels. The first experimental study found empirical evidence for the inverse S-shaped function on the basis of a within-subjects design, and the second study replicated the results using a between-subjects design.

From an academic perspective, we found it interesting that the strongest impact of CS on WTP is at the extremes of the satisfaction distribution. This finding is important because most of the previous research implicitly or explicitly assumes a linear relationship between CS and behavioral outcomes. More specifically, the results offer an advanced analytical understanding of the relationships in the satisfaction–profit chain and provide additional insights into the positive impact of CS on profitability.

Such insight is important for further research, which might examine optimal levels of CS (Kamakura et al. 2002) and develop analytical models related to this issue (i.e., develop a "CS calculus"). Such modeling approaches would need to integrate the effects of CS on loyalty and WTP as well as the cost implications of increasing CS. The focal point of such models would then be to identify optimal satisfaction levels in terms of the cost–benefit relationship. A precise understanding of the functional form of the relationship between CS and its outcomes is crucial for developing such models. In addition, it would be worthwhile to examine the possibility that at an upper-level threshold or point, WTP could level off. However, in most situations, it seems unlikely that products and services reach the very extreme levels of delight or disappointment that are needed to produce this effect.

The third objective of our study was to investigate the impact of transaction-specific and cumulative satisfaction on WTP. The results indicate that the relationship between CS and WTP becomes stronger as CS judgment moves from transaction-specific to cumulative. The findings show the importance of increasing cumulative CS (Olsen and Johnson 2003).

A potential limitation of Study 1 is that of common method bias (i.e., when all measures are acquired with the same instrument). However, in Study 2, we reduced this problem substantially by using the BDM method to assess WTP (Wertenbroch and Skiera 2002). The advantage of the BDM method is that it measures WTP as a behavioral outcome variable and that customers have an incentive to reveal their WTP truthfully. This should substantially decrease the potential of common method bias.

Our study represents only a first step in the study of relationships between CS and price-related constructs. This initial study suggests several possibilities for further research. For example, research could examine whether there are potential moderators that strengthen or weaken the relationship between CS and WTP. It could be hypothesized that the relationship is weaker in highly competitive markets than in low competitive markets.

In addition, further research should explore the relationship between CS and other price-related constructs. For example, it would be worthwhile to study the impact of CS on customers' reactions to price changes. It could be hypothesized that negative reactions to price increases are weaker for highly satisfied customers than for moderately satisfied customers. It would also be worthwhile to examine customers' perceptions of price changes. For example, customers may infer different types of motives (both positive and negative) when they encounter a price change (Campbell 1999). Research could investigate whether the level of CS influences the degree to which customers infer positive or negative motives.

Further research could also analyze the nature of the flat part of the functional relationship between satisfaction and WTP in more detail. It is plausible to argue that this area is centered on a point of zero disconfirmation. Further research could test this assumption by conducting a study that specifically has a no disconfirmation condition.

Managerial Implications

Our research supports the managerial belief that "satisfied customers—those receiving higher quality service or who feel better about the product—are, in fact, willing to pay more for it" (Finkelman 1993, p. 25) and that this relationship is nonlinear. The findings have important implications for setting prices and for investing in CS.

Our findings suggest that the customer's satisfaction level could influence a company's pricing strategy. Specifically, companies could potentially charge a premium price for their product or service if they have a high level of customer satisfaction. Note that this does not mean that a firm should selectively charge more-satisfied customers a higher price but rather that having a large segment of highly satisfied customers may enable the firm to charge higher prices in general.

Moreover, there are situations in which companies could charge higher prices to highly satisfied customers. Although this is not typically applicable in consumer goods marketing, it constitutes an option in markets in which prices are not standardized but rather are negotiated with individual customers. For example, this is the case in the marketing of customized products or professional services. In such environments, our findings inform managers that high levels of CS give them a stronger position to negotiate prices with their clients.

Moreover, the specific functional structure found in our study is also relevant for managers. More specifically, the finding that marginal payoffs from increasing CS increase if satisfaction is above the inflection point implies that (unlike in situations in which there are decreasing marginal returns) it may be suitable to aim for very high levels of CS.

However, it is worth emphasizing that generation of high levels of CS often involves significant costs. Therefore, managers need to consider whether it is financially viable to strive for very high levels of CS for certain customers or customer segments. A possible consequence of such considerations is that firms differentiate with respect to the aspired level of CS. More specifically, companies might strive for very high levels of CS (i.e., satisfaction levels in the steep part of the curve) among their highly valued customers but accept a lower level of satisfaction (possibly in the left part of the flat area of the curve) for their less valued customers.

Finally, our results suggest that approaches to the measurement and enhancement of CS should focus on cumulative satisfaction rather than on transaction-specific satisfaction. In business practice, many companies measure CS on the basis of specific transactions (i.e., the most recent purchase or service encounter). Our findings suggest that long-term, cumulative satisfaction is more relevant because it is the stronger driver of customer behavior (which, in this case, was WTP).

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Raphaëlle Lambert-Pandraud, Gilles Laurent, & Eric Lapersonne

Repeat Purchasing of New Automobiles by Older Consumers: Empirical Evidence and Interpretations

In a large empirical study, the authors find that older consumers, who constitute an important market segment, repurchase a brand more frequently when they buy a new car. Older consumers consider fewer brands, fewer dealers, and fewer models, and they choose long-established brands more often. To interpret the results, the authors rely on four age-related theoretical perspectives: biological aging, cognitive decline, socioemotional selectivity, and change aversion.

In developed countries, the growing segment of older consumers has become increasingly important economically. In France, people age 60 and older constitute 20% of the current population, a percentage that is likely to increase to 27% by 2010 (Daguet 1996). In the United States, the number of people age 65 and older is 35 million and is projected to increase to 50 million by 2010 (Polyak 2000). The purchasing power of the older segment is also increasing. Compared with the average household in the United States (*American Demographics* 2002), households whose members are age 65 and older spend more not only on drugs (+180%) and medical services (+67%) but also on fresh fruit and vegetables (+50%) and general household expenses (+39%). For the new-car market, buyers age 60 and above represent 21% of the U.S. market (Krebs 2000) and 29% of the French market.

The sheer size of the older segment, though managerially important, does not justify a specific research project if older consumers behave similarly to younger ones, but older consumers behave differently, at least in their repeat purchase behavior. Repeat purchases and brand loyalty are of great managerial importance (Uncles and Laurent 1997), as is evidenced by the many articles and books devoted to the greater profitability of keeping existing customers rather than acquiring new ones (e.g., Reichheld and Teal 1996). Most studies concentrate on marketing actions that may lead to more frequent repeat purchases, but there has been little analysis of the impact of permanent customer characteristics, such as their demographics. Whereas various marketing practitioners report higher levels of repeat purchase behavior by older consumers (e.g., see Secodip's [1998, p. 1] analysis of "60 markets and 600 brands"), to preserve confidentiality, they rarely present detailed results. In contrast, Burnett (2002) finds that older consumers are neither more loyal nor more committed to brands of bath soap, shampoo, deodorants, and cellular telephones. Given the contradictions and the practical importance of the question, it is surprising that the possible impact of age on repeat purchase behavior has seldomly been mentioned in academic literature (Phillips and Sternthal 1977; Tongren 1988), though we review a few exceptions subsequently.

In this study, we attempt to achieve three main objectives: (1) to measure precisely and reliably whether older consumers have greater tendencies to repurchase, (2) to identify related characteristics of older consumers' purchase processes, which may be unique to their demographic, and (3) to investigate possible reasons for the underlying differences in purchase behaviors between older and younger consumers.

We analyze new-car purchases, a category with strong consumer involvement, a high average repeat purchase rate, and great economic importance. Each year, 2.2 million new cars (versus 5.4 million used cars) are sold in France, and most are purchased by individual consumers, not by companies for their fleet. We review the few previous studies that examine older consumers' repeat purchase behaviors, and then we justify the choice of the new-automobile market. Next, we present results related to repeat purchasing and to characteristics of the purchase process. We then interpret the results in light of several theoretical approaches, highlighting the extent to which each theory can explain a result. We summarize this discussion with four theory-based

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Raphaëlle Lambert-Pandraud is Associate Professor of Marketing, Negocia (e-mail: rpandrau@negocia.fr). Gilles Laurent is Carrefour Professor of Marketing, Marketing Department, HEC School of Management, Paris (e-mail: laurent@hec.fr). Eric Lapersonne is Maître de Conferences, Departement des Techniques de Commercialisation, Institut Universitaire de Technologie, Universite de Cergy-Pontoise (e-mail: eric.lapersonne@iutc.u-cergy.fr). This article is based on Raphaëlle Lambert-Pandraud's dissertation, which was written under the supervision of Gilles Laurent at HEC School of Management. The authors thank Peugeot SA, especially Daniel Bachelet and Claude Le Minor, for supplying the data. They gratefully acknowledge Amitava Chattopadhyay, Carolyn Yoon, Marc Vanhuele, and the four anonymous *JM* reviewers for their constructive comments.

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propositions that are compatible with the results and can be tested by further comparative studies

Previous Studies

Few, if any, studies have explicitly analyzed the impact of age on repeat purchase behavior More often, researchers examine its impact on consideration sets and find that a smaller consideration set should increase the probability of a repeat purchase if the previous brand is included in the set Deshpandé and Zaltman (1978) and Deshpandé and Krishnan (1982) find that older consumers tend to make fewer price comparisons and collect less information before they purchase Uncles and Ehrenberg (1990) observe that, on average, older households, in which members are age 55 and older, buy fewer brands of frequently purchased consumer goods, partly because of their smaller purchase rate Cole and Balasubramanian (1993) find that older people consider fewer brands and varieties of cereals before a purchase Similarly, Aurier and Jean (1996) report that the number of drinks considered during specific purchase occasions decreases with age In contrast, neither Gruca (1989) nor Campbell (1969) observes a significant relationship between consumer age and the size of the consideration set for coffee and grocery products, respectively

Prior results converge more for new-car purchases Johnson (1990) and Srinivasan and Ratchford (1991) observe that older consumers search for less information before they make a decision Maddox and colleagues (1978) find that the increased age of consumers decreases the number of car brands they consider From another perspective, Punj and Cattin (1983) find that car buyers who consider a single dealer are significantly older, which they attribute to the higher psychological cost of information search Lapersonne, Laurent, and Le Goff (1995, p 55) mention the link between a smaller consideration set and more frequent repeat purchases, and they indicate that being age 60 and older significantly increases the probability that the consumer will have a "consideration set of size one" before the purchase of a new car, which in four of five cases leads to a repeat purchase The studies describe the "shrinkage" of the decision process with age, including fewer brands considered and bought, fewer price comparisons made, fewer drinks considered, less information sought, and fewer dealers considered, all of which mean that older consumers consider fewer options on the basis of the more limited information they attain

Using a large data set, we consider this shrinkage more broadly in terms of brands, dealers, and models, and we analyze repeat purchases for both brands and dealers We also analyze separately older (ages 60–74) and very old (age 75 and older) buyers We rely on the most relevant age-related theoretical approaches to interpret our results

Methodology and Data

Surveying Actual New-Car Purchases

We use a survey rather than experimental methodology Given our goals, external validity is essential, and therefore we study real-life decisions The use of hypothetical decisions and artificial brands would present major drawbacks New-car purchases provide a pertinent study domain for several reasons Car purchases are important and visible, and we can check brand and model choices through official registration documents We can also study the steps in the purchase process precisely, because they take place in an environment (in France at that time) in which each dealer sells only one brand of new car, we prefer this option because collecting information about multiple brands or models entails significant costs in terms of time, transportation, energy, and mental resources

Therefore, we analyze a secondary survey of recent individual new-car buyers that a leading French market research company conducted over a one-year period (from July 1997 to June 1998) For 40 years, this survey has been conducted annually in the five largest Western European countries and every other year in approximately ten other countries with a similar questionnaire and methodology[1] Questionnaires are mailed to a random sample that is drawn from the mandatory, government-run registration system for new cars The questionnaire takes approximately 60 minutes to complete, and the response rate is slightly less than 40% Responses are weighted to match the sample exactly to the population of car purchasers in terms of purchased brands and models The sample (see Appendix A) is representative of the population of individual new-car purchasers and comprises 31,497 buyers who are the main users of the car We analyze only the 28,913 respondents who bought a new car to replace a previous car

Because of the long intervals between consumers' car purchases, the cross-sectional sample represents current purchasers rather than a permanent panel of households The mail survey is sent eight times a year, so on average it reaches each buyer three months after his or her car purchase A possible bias in the survey could result from the greater likelihood that older people underreport the number of brands, dealers, and models they considered because they suffer memory problems However, we found no link in our data set between these variables and the delay between the car purchase and the survey This finding may be a result of the special characteristics of our study, that is, cars are extremely involving products, and therefore buyers are much more likely to remember the purchase process for cars than for lower-involvement, frequently purchased products In addition, respondents have a greater chance of remembering the details of the purchase process because the delay between the purchase and the survey is short (with a long delay between the two, there could be a risk of respondents' forgetting details of the purchase)

Among the 193 variables that the survey measures, we use items that describe the recently purchased car (brand and model), the previous car, other brands and models considered, dealers visited, and the level of satisfaction with the previous car and previous dealer In addition, general descriptors of the respondents include not only age but also complete demographics with respect to education, income, gender, location, occupation, retirement status, and marital status By taking individual characteristics into account, we can reduce the bias that is induced by cohort effects in the cross-sectional analysis (Schaie 1965, Whitbourne 1996) The questions we use are allocated across the eight-page survey as follows the car recently bought (p 1), the previous car (p 5), brands and models considered (p 3), dealers visited (p 3), satisfaction (p 6), and demographics (p 7)

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[1] Another year of the same survey is the basis for the comparative analysis of brand-switching methods that Colombo, Ehrenberg, and Sabavala (2000) report

Statistical Analysis

Age is the main explanatory variable of interest in this study Investigating older consumers' behavior poses several methodological problems Tongren (1988) notes that three-quarters of studies of older consumers make no comparisons with younger consumers In our study, we surveyed buyers of all ages and demographic characteristics, which enabled us to compare the choice process across age groups In addition, age limits have varied across previous studies, which makes comparisons of the results even more difficult In contrast to previous studies, we know the exact age of each respondent, and therefore we could use age as a ratio-scaled explanatory variable with a linear impact on the variables of interest However, literature on gerontology and psychology (on which we rely because almost no data on this problem appear in marketing literature) suggests that this approach would be erroneous because of the nonlinear impact of age on daily life and decisions

That is, aging occurs through a series of qualitative changes rather than as a continuous, underlying process The changes occur at varying times for different people because of individual and environmental differences Nevertheless, gerontology and psychology literature offers a reliable basis for defining "older" consumers Typically, elderly people are defined as older than age 60 or 65 (Heslop and Marshall 1990), far beyond the age of 50, which marketing practitioners often use (Treguer 1994) As Lesser and Kunkel (1991) explain, people between ages 40 and 59 are at their peak in terms of problem-solving abilities and social maturity Gerontology research based on social psychology relies on the retirement age, which is usually near age 60 Research based on cognitive psychology studies people older than age 60 or 65, and it reports a stronger cognitive decline in daily life among people older than approximately age 75 (Chasseigne, Mullet, and Stewart 1997) Therefore, we coded age as a categorical variable and based the limits between successive categories on psychological literature We adopted Schaie's (1996) categorization of the elderly, distinguishing "young-old" (ages 60–74) from "old-old" (age 75 and older) consumers We divided the remaining respondents into two subgroups a "middle-aged" group (ages 40–59), the reference group against which the young-old and old-old consumers can be compared, and a "young" group (age 39 and younger), which is not of interest but whose indicator variable we include in the statistical analysis

We also controlled for other factors that may have an impact on purchase behavior As we noted previously, the survey provides a complete set of categorical demographic variables For each of the following variables, we used one category as the reference and created dummies for the other categories education, income, occupation, city size, marital status, gender, and retirement status (defined only for people ages 55–65)

In addition, several variables describe the context of the car purchase We measured satisfaction with the previous car and previous dealer (if the dealer took care of that car) by a single item (in both cases, respondents provide a rating on a scale from 1 to 10), and we noted the absence of such a dealer (a binary variable), whether the previous car was bought secondhand, and how long the consumer owned the previous car We considered these variables because previous research has indicated that they influence car repurchase (Lapersonne, Laurent, and Le Goff 1995)

Most of the dependent variables are binary (e g , whether the previous brand is repurchased), and we analyzed them through logistic regression We used an analysis of variance on the quantitative dependent variables (e g , number of brands considered) Given the large number of aspects of purchase behavior that we investigate and the many explanatory variables other than age, we present the results in three complementary forms In Table 1, we describe the impact (χ^2 in the logistic regression, F in the analysis of variance) of the explanatory variables (i e , age, demographics, and context of the car purchase) on each of the dependent variables Because of space limitations, we do not comment on the results for the explanatory variables other than age (e g , as Table 1 shows, satisfaction with the previous car and with the previous dealer is important) Age is always a significant variable and is often the most significant In Table 2, we provide the estimated parameters for age that correspond to the young, young-old, and old-old groups, the middle-aged group is the reference Finally, we illustrate the impact of age and show how the percentage of answers (for binary variables) or the average value (for quantitative variables) varies with age

Results

Repeat Purchasing

Age had a strong impact on the probability that a consumer would repurchase the previous brand ($\chi^2[3] = 77\ 69$, Table 1) Of the young buyers, 42% repurchased the previous brand versus 54% of the middle-aged, 66% of the young-old, and 72% of the old-old (Figure 1, Part A) Accordingly, older consumers were also more likely than were middle-aged or young buyers to consider their previous brand ($\chi^2[3] = 42\ 65$) However, the effect was significant only for old-old buyers Of the young buyers, 61% considered their previous brand, compared with 73% of the middle-aged, 80% of the young-old, and 83% of the old-old (Figure 1, Panel B) Finally, an extreme focus on the previous brand occurred when buyers considered nothing but that brand Empirical data marginally support (p = 06, Table 2) the hypothesis that old-old buyers are more likely to consider only one brand 6% for the young, 11% for the middle-aged, 21% for the young-old, and 27% for the old-old (Figure 1, Panel C)

TABLE 1

Impact of Age, Other Demographic Variables, and Variables of the Car Purchase Context on Characteristics of the Purchase Process (χ^2 or F and Significance)

Dependent Variable	Age	Education	Income	Occupation	City Size	Marital Status	Gender	Retired (if 55–65)	Satisfied with Previous Car	Satisfied with Previous Car's Dealer	No Dealer for Previous Car	Previous Car Was Secondhand	Length of Use of Previous Car
Degrees of freedom	3	2	2	3	2	1	1	1	1	1	1	1	1
Number of brands considered (F)	18 9†	51†	48†	5**	21†	3 2 (p = 07)	57†	2 4	2 2	216†	34†	8	111†
Considering only one brand	42†	38†	125†	5 9	5 8*	5	10 4**	1 5	7 1**	67†	42†	1 7	34†
Considering only one dealer	129†	76†	11 6**	13 7**	44†	33†	49†	6 9*	1 2	158†	18 8†	10 4**	74†
Number of models considered (F)	32†	63†	47†	4 7**	30†	5*	82†	1 4	2	196†	22†	10 9**	118†
Considering the previous brand	43†	1	15 2***	35†	28†	14 05***	18 5†	4	235†	231†	207†	48†	21†
Considering only the previous brand	50†	27†	78†	6	4 8	3 3 (p = 07)	3 9*	1 6	53†	127†	81†	2	46†
Repurchasing the previous brand	78†	8 7*	8	6 8 (p = 07)	26†	10 4***	3 7*	1 1	59†	522†	352†	45†	177†
Repurchasing from previous dealer	102†	15 7***	7 9*	12 5**	66†	6 6*	3 4	6*	18 3†	559†	296†	561†	596†
Considering long-established national brands	34†	31†	3 4	18 95***	35†	0	7 3**	8 1*	3	0	2 9	4 4*	80†
Switching to long-established national brands when changing brand	11 3*	4 15	1 5	7 (p = 07)	30†	4 6*	0	2	3 6	5 5*	32†	17 5†	3

*p < 05
**p < 01
***p < 001
†p < 0001

TABLE 2
Impact of Age on Characteristics of the Purchase Process (Parameter Estimates)

Dependent Age Categories	18–39	60–74	75 and Above
Number of brands considered	07†	– 08**	– 19†
Considering only one brand	– 34†	16 (p = 06)	31**
Considering only one dealer	– 22†	34†	1 04†
Number of models considered	08†	– 11†	– 27†
Considering the previous brand	– 26†	13	25*
Considering only the previous brand	– 47†	15	24 (p = 06)
Repurchasing the previous brand	– 28†	29†	58†
Repurchasing from previous dealer	– 42†	20**	32**
Considering long-established national brands when changing brand	– 19†	18*	45***
Switching to long-established national brands when changing brand	– 07	32**	43*

*p < 05

**p < 01

***p < 001

†p < 0001

Notes Controlling for the other variables (other demographics, variables describing the context of the car purchase)

Thus, older consumers considered the previous brand more often, considered it alone more often, and, most important, purchased it more often The results we report in Tables 1 and 2 indicate that this finding was not due to the spurious effect of important context variables, such as satisfaction with the previous car, satisfaction with the previous dealer, the absence of a regular dealer to handle the previous car, or whether the previous car was bought secondhand or long ago Although these variables, as well as several demographic factors, significantly affected the focus on the previous brand, the impact of age remained strong, even when we took all of the other variables into account

We illustrate the findings in Figure 2 In each case, we plot separate curves for consumers younger than age 60 and for those age 60 and older The curves show how the predicted probability varies as a function of satisfaction with the previous car For a given satisfaction level, older buyers were more likely to consider the previous brand (Figure 2, Panel A), consider nothing but it (Panel B), and repurchase it (Panel C) The three results converge Whereas satisfaction with the previous car was a powerful driver of the consideration and repurchase of the previous brand, age remained a strong, specific effect

In the peculiar structure of the car market, another form of repeat purchasing is the purchase of a new car from the previous dealer Older buyers were more likely to purchase from a previous dealer ($\chi^2[3]$ = 101 95, Table 1), and the effect was stronger for old-old consumers (21% for the young, 34% for the middle-aged, 44% for the young-old, and 49% for the old-old, Figure 1, Panel D) Again, this finding was not due to greater satisfaction among older consumers For a given satisfaction level with the previous brand, older consumers (age 60 and older) were more likely to purchase from the previous dealer, and the effect was stronger for old-old consumers

Smaller Consideration Set

According to Lapersonne, Laurent, and Le Goff (1995), the repeat purchase of cars should be associated with a reduced consideration set, and in our study, age had a significant impact on the number of brands considered (F[3,∞] = 18 91, Table 1) The average number of brands considered was as follows 2 24 by young buyers, 2 16 by middle-aged buyers, 1 92 by young-old buyers, and only 1 77 by old-old buyers (Figure 3, Panel A) Older buyers of new cars were much less likely to consider three or more brands (24% for the young, 22% for the middle-aged, 14% for the young-old, and 7% for the old-old) The extreme form of this phenomenon was buyers who considered only a single brand ($\chi^2[3]$ = 41 79, Table 1), whose percentage strongly increased with age (11% for the young, 15% for the middle-aged, 26% for the young-old, and 33% for the old-old) The results confirm that repeat purchasing is only one component of the more general shrinkage of the decision process that is associated with age Older buyers make their purchase decisions from a reduced framework in which the number of alternative cars they consider is smaller The peculiar phenomenon of a consideration set of size one (Lapersonne, Laurent, and Le Goff 1995) applies to 25% of young-old car buyers and to 33% of old-old buyers

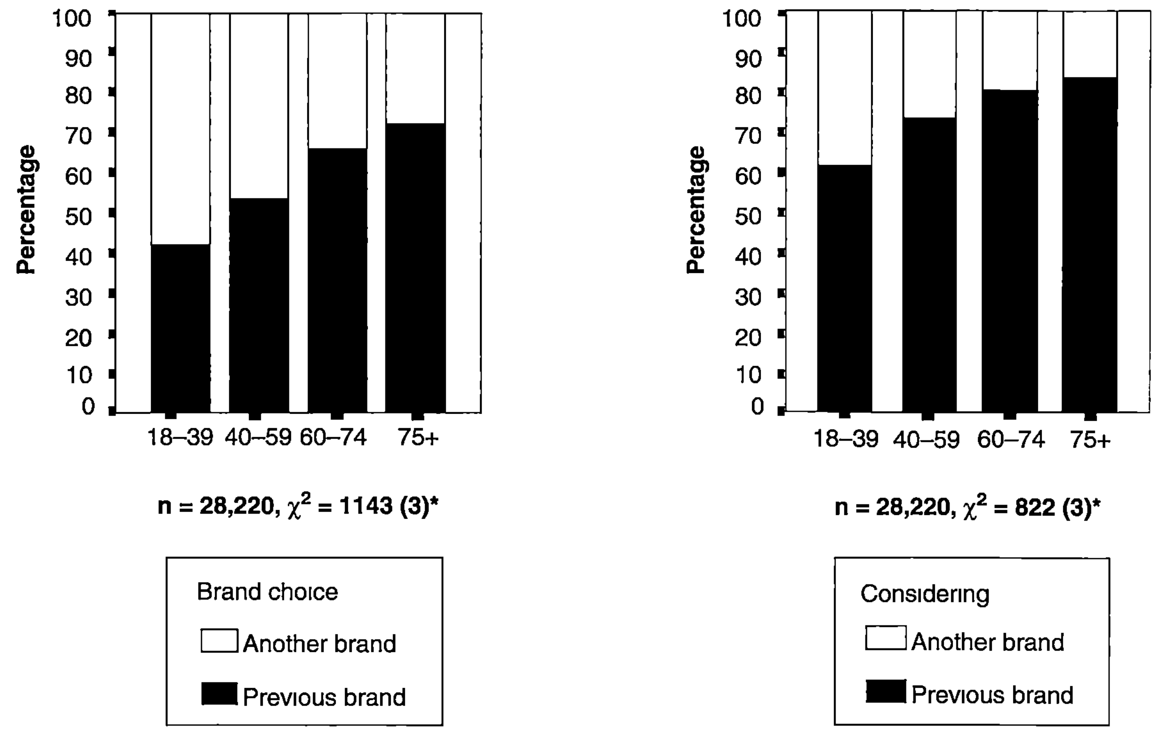
Another way for a buyer to simplify the purchase process is to consider a single dealer, though any given brand is offered by multiple dealers, and different prices might be negotiated by visiting more than one dealer Age had a strong effect on the probability of considering a single dealer ($\chi^2[3]$ = 128 60, Table 1) The percentage of new-car buyers who considered a single dealer strongly increased with age (47% for the young, 53% for the middle-aged, 66% for the young-old, and 79% for the old-old, Figure 3, Panel B) Again, the results suggest a simplified, considerably shrunken purchase process, throughout which older consumers rarely collect information from additional dealers

However, a given brand offers many models, and a consumer could go through a complex decision process if he or she considered all the possible models that a single brand and dealer offer Here again, the impact of age was significant (F[3, ∞] = 31 83, Table 1) The average number of models considered was as follows 2 37 by young buyers, 2 26 by middle-aged buyers, 2 00 by young-old buyers, and

FIGURE 1
Older Consumers Focus More on the Previous Brand

A. Older Consumers More Often Repurchasing the Previous Brand

B: Older Consumers More Likely to Consider the Previous Brand

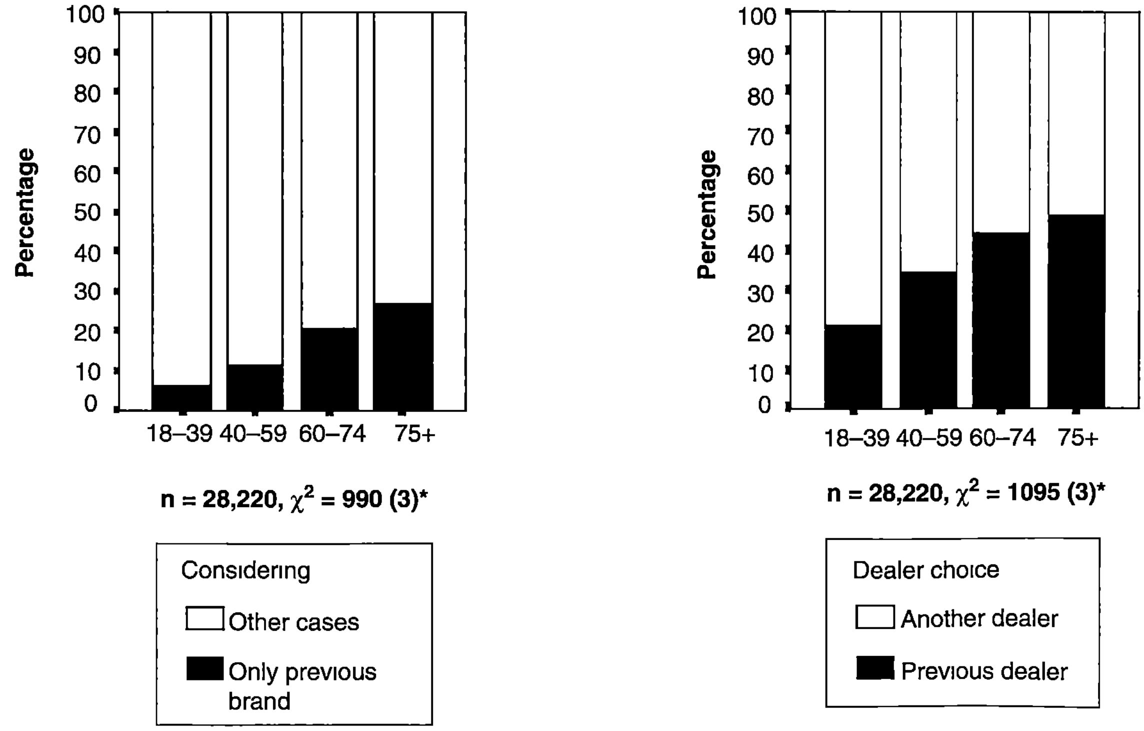


n = 28,220, χ^2 = 1143 (3)*

n = 28,220, χ^2 = 822 (3)*

C: Older Consumers More Often Considering Only the Previous Brand

D: Older Consumers More Likely to Purchase from the Previous Dealer



n = 28,220, χ^2 = 990 (3)*

n = 28,220, χ^2 = 1095 (3)*

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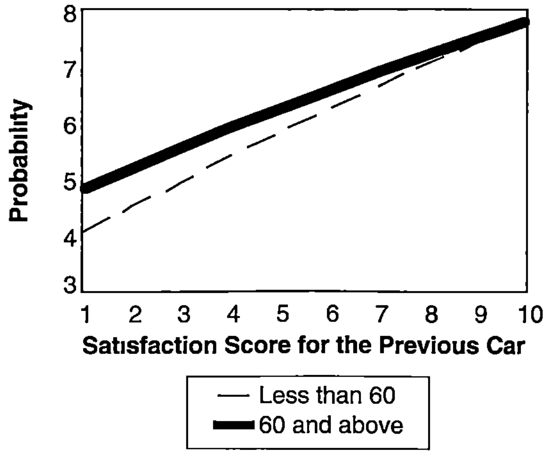
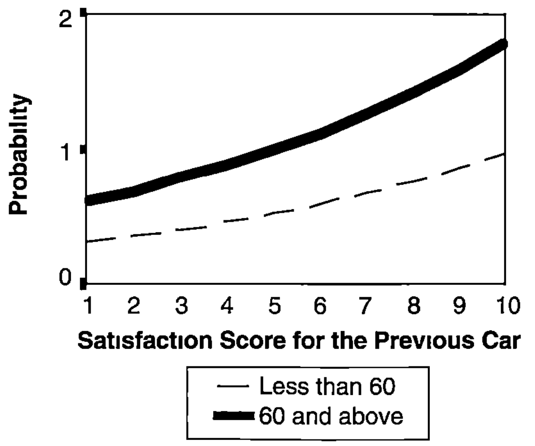
*$p <$ 0001

FIGURE 2
Satisfaction Level and Focus on the Previous Brand

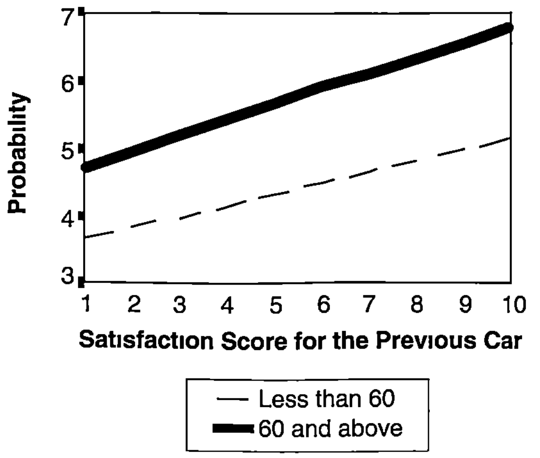
A. For a Given Satisfaction Level, Older Buyers More Likely to Consider the Previous Brand



B. For a Given Satisfaction Level, Older Buyers More Likely to Consider Only the Previous Brand



C For a Given Satisfaction Level, Older Buyers More Likely to Purchase the Previous Brand



1 83 by old-old buyers (Figure 3, Panel C) The consideration of a single model increased markedly with age (6% of young buyers, 11% of middle-aged buyers, 20% of young-old buyers, and 28% of old-old buyers), whereas the percentage of buyers who considered three or more models dropped sharply with age (30%, 26%, 16%, and 8%, respectively)

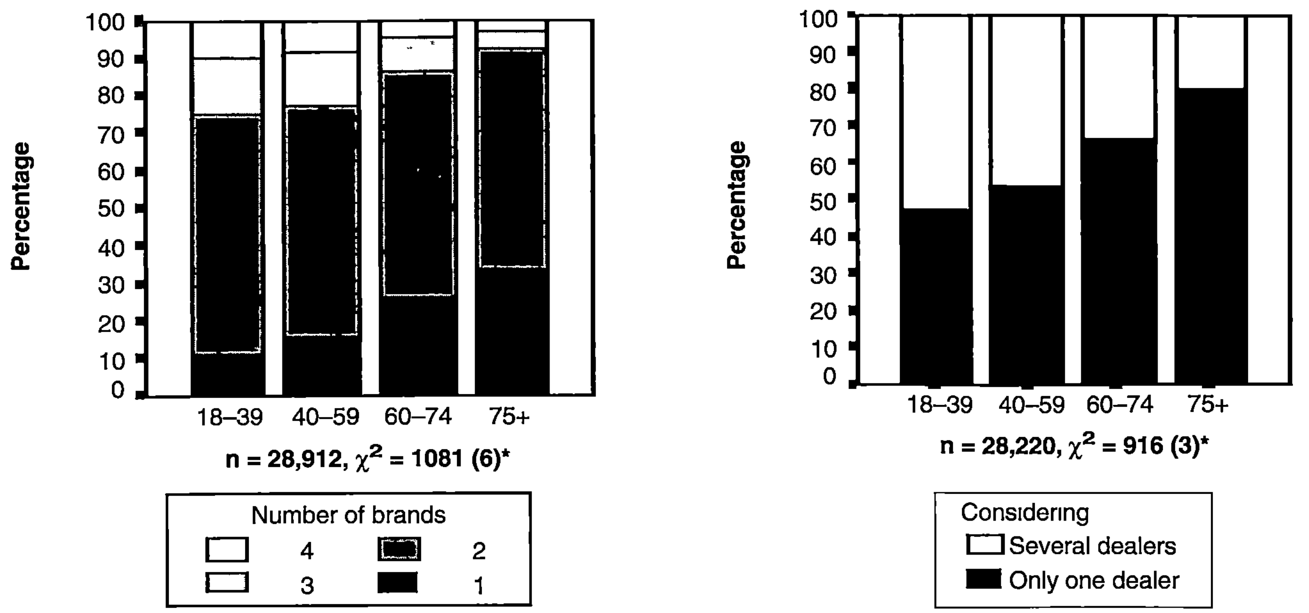
The preceding group of analyses leads us to the following conclusions Among older buyers, we observe a shrinkage of the choice set before the purchase of a new car Older buyers considered fewer brands and often just a single brand (25% of young-old purchasers and 33% of old-old purchasers) In addition, they considered a single dealer and a single model more often

Privileged Status for Other Long-Established Brands

The last set of results relates to long-established brands (i e , brands that have been offered for a long period and have become familiar to older consumers) In the French automobile market, as in many other countries, an easy and reliable distinction can be made between two brands groups national brands (i e , Renault, Peugeot, Citroen), which have been around for approximately a century, and foreign brands, which typically have entered the market much more recently (e g , Fiat was introduced in France in 1966, Toyota in 1983, and Daewoo in 1997) We argue that older consumers may have developed knowledge about the market as it was at the time of their previous purchases, that is, when French brands held the leading position (e g , 95% of car sales in 1960 versus less than 50% today) Because their previous purchase was probably a national brand, older consumers have accumulated more long-term knowledge of these brands than they have of recently entered foreign brands In addition, French car manufacturers retain more dealers that have been established for much longer periods French consumers might encounter a third-generation dealer of a French brand, whereas a foreign brand has no such long-term presence Thus, older French consumers also are likely to have better long-term knowledge about the dealers of French brands Therefore, older consumers should be more likely than younger consumers to consider long-established national brands, even if they are not the consumers' previous brand

To measure this phenomenon, we studied only respondents who did not repurchase their previous brand We found that among these respondents, older buyers were more likely than younger buyers to consider national brands ($\chi^2[3]$ = 34 00, Table 1) The direction of the age effect was as we expected (Table 2, Figure 4, Panel A) The acid test of this bias in favor of long-established brands was their actual purchase, and when older consumers changed brands, they were more likely to switch to a national brand than to a foreign brand ($\chi^2[3]$ = 11 30, Tables 1 and 2, Figure 4, Panel B) Among buyers who previously owned a national brand car, the percentage of switches to another national brand regularly increased with age (40% for the young, 45% for the middle-aged, 59% for the young-old, and 66% for the old-old) Among buyers who previously owned a foreign car, the percentage of switches to a national brand also

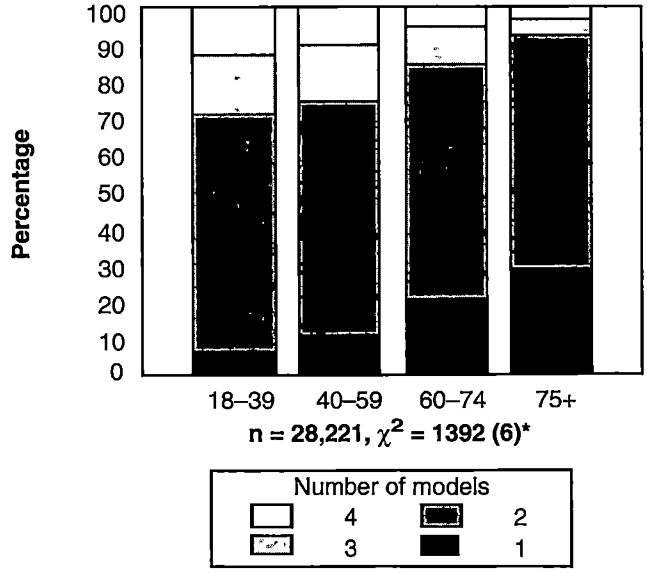
FIGURE 3
Older Consumers and Consideration Set



A: Older Buyers Considering Fewer Brands

B: Older Buyers More Likely to Consider a Single Dealer

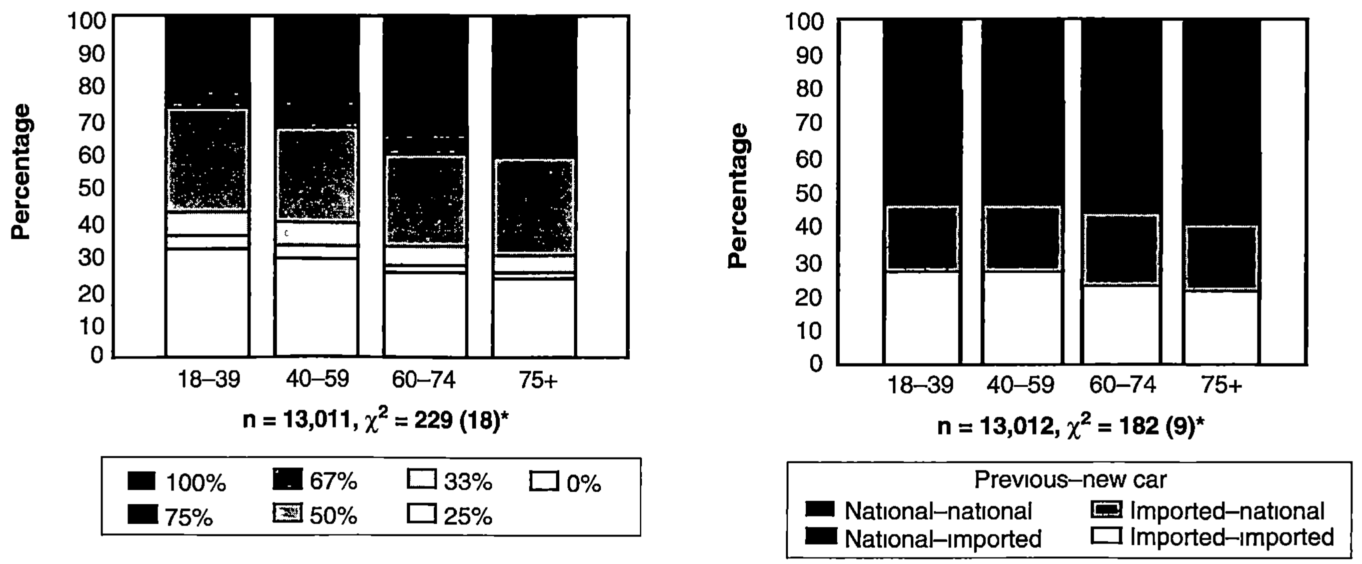
C: Older Buyers Considering Fewer Models



*$p < .0001$

increased with age, though less markedly (43% for the young and middle-aged, 48% for the young-old, and 49% for the old-old). However, for young and middle-aged buyers, this figure does not appear to depend on whether the previous car was French or foreign, whereas for young-old and old-old buyers, the likelihood of a French car purchase is clearly higher when their previous car was French. Thus, in addition to older buyers' focus on their previous brand and their reduced consideration set, they also had a bias toward well-known, long-established brands. When older consumers switched brands, this bias, combined with their tendency to repurchase the previous brand, led them to pur-

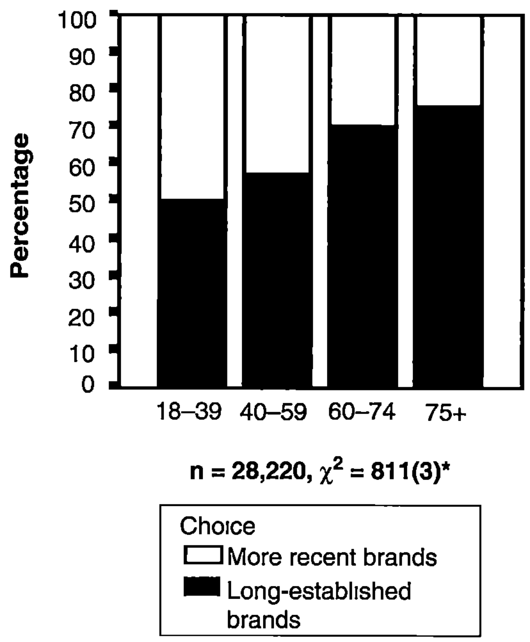
FIGURE 4
Older Consumers Give a Privileged Status to Long-Established Brands



A: Older Consumers Have a Large Proportion of National Brands in Their Consideration Set (Brand Switchers Only)

B: When Switching, Older Consumers Are More Likely to Switch to National Brands

C Older Consumers More Often Buy Long-Established Brands



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*p < 0001

chase long-established, national brands more often 49% for the young, 56% for the middle-aged, 69% for the young-old, and 74% for the old-old (Figure 4, Panel C)

Our initial motivation for this article was to investigate the repeat purchase behavior of older consumers From a large representative sample of new-car buyers, we observe not only a higher rate of repeat buying among older consumers but also a general shrinkage of their decision process, which includes a greater focus on the previous brand and dealer and the consideration of fewer brands, dealers, and models In addition, young-old buyers and especially old-old buyers were more likely to switch to national, long-established, familiar brands when they switched away from the previous brand

Discussion

What are the mechanisms that underlie the results? Literature in marketing, gerontology, and psychology suggests various explanations In this section, we consider four tentative marketing explanations and evaluate them on empirical grounds using another data set (i e , a nationally representative survey of 1015 recent purchasers of a new car) We then present four potential explanations derived from gerontology and psychology and assess more precisely which rationales can explain each of our results

Four Potential Consumer Behavior Explanations

Consumer behavior literature suggests four potential explanations for buyers' actions involvement, expertise, national preference, and gender In each case, the variable known or hypothesized to have an impact on our dependent variables is likely to vary with age

Involvement A tentative explanation for the shrinkage of the purchasing-decision process could be older buyers' reduced involvement in the product and, consequently, in the purchase process Among the different facets of involvement (Laurent and Kapferer 1985), interest appears to be the most relevant Older people are less interested in cars, which causes them to "shrink" their purchase process, consider fewer brands, and stay with the previous brand If they switch, this lack of interest leads them to return to long-established brands rather than to learn about newer brands Unfortunately, the main data set does not measure involvement Therefore, we use the second, smaller data set to measure interest in the product category, using Laurent and Kapferer's (1985) scale, and find that it has good reliability (4 items, $\alpha =$ 80) but is not correlated with age (r = 014, not significant [n s]) Furthermore, in contrast to age, interest has no significant impact on the three available measures of prepurchase information seeking (i e , number of brands considered, number of information sources, or probability of test driving the new car) Thus, we do not find support for the results in the tentative explanation that older consumers have decreased interest in cars

Expertise Several classical contributions have demonstrated the role of expertise in the consumers' decision processes (e g , Alba and Hutchinson 1987) The logic behind the theories is that accumulated experience in a product category, or a personal history of purchases and usage, leads to a consumer's higher level of expertise with respect to the products offered in this category, as well as to a routinized decision process (Howard and Sheth 1969) In contrast, neophytes have everything to learn and must spend much more time collecting and processing information

The expertise construct applies to the car market, because, in general, older consumers have accumulated more experience by purchasing more cars over their lifetime than have younger consumers We could also argue that more experience leads to increased expertise, which is defined as a good knowledge of cars (Punj and Staelin 1983) and high self-confidence about that knowledge (Furse, Punj, and Stewart 1984) Therefore, older (more expert) buyers should be able to identify their preferred car better, which in turn leads them to consider fewer brands and dealers (they know the "good" ones) and be more loyal to those brands and dealers (they repeatedly choose the same "good" one) Because the main survey did not measure expertise, we resort again to the second data set in which expertise is measured by a three-item scale ($\alpha =$ 74) (Although it would be interesting to analyze specific facets of car expertise separately, it would require distinct measures of each facet) We measure experience by the number of cars that consumers previously bought The results indicate that expertise increases with age through the mediation of experience (see Appendix B)

However, the impact of expertise on consumers' search for information (i e , the number of information sources they use, the number of brands they consider, and the number of test drives they take) is the opposite Expertise increases information search, whereas age significantly decreases it This finding represents an interesting complement to the questions that Cole and Balasubramanian (1993) pose about the relationship between category knowledge and age Our results may demonstrate the specific characteristics of car purchases, which differ from those of many other categories, including the category that Cole and Balasubramanian (1993) study (i e , cereals) Car purchases are made at intervals of a few years Although brands tend to be stable, the models change markedly from one purchase occasion to the next and almost entirely over a ten-year period Therefore, expertise that a consumer may acquire during the purchase process of a model is of limited usefulness by the time the next car purchase occurs Overall, our results cannot be explained by older consumers' increased expertise

National preference We could argue that older people tend to have a stronger national preference, which may lead them to consider long-established national brands and thus have smaller consideration sets Again, we use the secondary survey to test this argument As we indicate in Appendix B, we use two items to create a brief scale of national preference for cars with a low but acceptable reliability ($\alpha =$ 58) The measure of national preference has a significant, positive impact on the likelihood of purchasing a French car ($\chi^2 = 99\ 51$, degree of freedom [d f] = 1 in the logistic regression), but it is not correlated with age (r = 025, n s) Note that both national preference and age have significant but separate effects on the purchase of a national brand Thus, we find no support for the tentative explanation that increased national preference mediates the impact of age

Gender Another tentative explanation of greater loyalty toward brands and dealers could be the allegedly higher percentage of female consumers among older buyers and the alleged tendency of female consumers to be more cautious We can dismiss this explanation easily, because in our sample, as in the overall population, the percentage of female car buyers is smaller among older groups (37%

among the young, 31% among the middle-aged, 17% among the young-old, and 13% among the old-old, χ^2 = 948, d f = 3) We control for gender in all our statistical analyses

Therefore, we set aside these four classical consumer behavior variables as explanations for our results, instead, we propose alternative explanations based on previous research in gerontology and psychology (Salthouse 1991)

Four Explanations Suggested by Psychology and Gerontology

We consider four possible mechanisms that may explain our results (see Table 3) biological aging, cognitive decline, socioemotional selectivity, and decision aversion Whereas biological aging and cognitive decline make the decision process more difficult for unknown, unfamiliar solutions, socioemotional selectivity and decision aversion make known, familiar solutions more attractive

To provide illustrative vignettes of the theoretical interpretations, we interviewed six older consumers who had recently bought a new car We held the qualitative interviews in Paris or its western suburbs Potential respondents were approached and asked whether they were still driving a car, whether they had bought the car themselves (or with their spouse), and whether the newly purchased car had replaced a car of the same make The respondents (three men and three women) were ages 69–85 and were retired All six interviewees indicated that they had bought their car at a dealership that they had known for a long time (at least 10 years and, in one case, 40 years) without visiting another dealership In addition, each had considered a single brand, a single model, and a single dealer

We then let interviewees explain the rationale for their choice, using a simple follow-up question "For this car's purchase, you only considered brand XX?" We also asked them about their previous car, including their likes, dislikes, and satisfaction The final question on the topic asked, "Why didn't you consider another brand for your new car?" We then asked the participants to talk about the dealer that sold the new car We also asked questions related to their knowledge of the manager and their likes, dislikes, satisfaction, length of relationship, trust, and previous purchases at the dealership We asked each interviewee to list the dealerships located near his or her home We ended the interview with demographic questions, including the year of birth, educational level, former profession, and marital status (the participant's gender was easy to observe) We conducted the interviews during the first week of July 2004, and each lasted an average of 30 minutes Finally, we transcribed the interviewees' answers word for word, we use the excerpts in the following discussion

Biological aging A possible explanation for the results could be the decline of physical capacities that occurs because of biological aging, or "the array of modifications happening in the organism with age, and lowering its resistance and adaptability to the pressures of the environment" (Barrère 1992, p 16) First, older people with serious physical problems are unlikely to drive a car and therefore to belong to our population of interest Second, according to Jean-Claude Henrard, the chief surgeon at St Perrine Hospital's Geriatrics Department, no clear biologically based slowdown occurs in daily social life until an advanced age of 80 and older A majority of people between ages 60–74 report having no problems walking and say that they shop "often" or "every day" In contrast, of people age 80 and older, more than half report that they have problems walking and shop only "occasionally" or "never" Among people ages 60–74, more than 80% "go everywhere," whereas only 34% of those age 80 and older do so (David and Starzec 1996)

Thus, physical impairment may reduce the number of dealers that old-old consumers visit, but the same may not be true for young-old consumers In the follow-up interviews, three people indicated that they bought cars from dealers that were located farther away from their homes than were the closest dealerships of their brand There was a respondent who even continued to buy from a Citroen dealer near the plant in the southern suburbs of Paris where he was a production manager 40 years ago, even though another Citroen dealer is located closer to his current address in the western suburbs When we asked why he took the trouble of traveling to a distant dealership instead of buying from the one nearby, he explained that he was "very happy about this dealership" When we asked what other dealerships existed in their neighborhood, the two other interviewees who purchased cars from dealers that were far from where they lived answered, "I don't care" or "I don't know" Thus, it appears that physical impairment does not explain the behavior of the three respondents, who range from age 73 to 85 Furthermore, physical problems should have no impact on the number of models considered or the nature of the brands considered (long-established or

TABLE 3
Four Potential Explanations from Psychology and Gerontology for Empirical Results

	Repeat Brand	Repeat Dealer	Consider Fewer Brands	Consider Fewer Models	Consider Fewer Dealers	Back to Long-Established Brands
Biological aging			+		+	
Cognitive decline	+	+	+	+	+	+
Socioemotional selectivity	+	+	+		+	+
Change aversion	+	+	+	+	+	

recent) Overall, biological aging can explain only a few of the results (Table 3)

Cognitive decline Older consumers may behave differently because their memory limits their consideration set to the previously owned or already known brands or because they are no longer able to evaluate several complex options in minute detail Research in cognitive psychology offers some reliable lessons on this aspect of aging Various psychometric tests in different countries at different dates, using both cross-sectional and longitudinal designs, have shown that cognitive capacities decline with age The conclusions have been reinforced and better explained by more recent studies that use neuroimaging techniques (Hedden and Gabrieli 2004) to show the age-related decline of functions that are active in the dorsolateral prefrontal cortex, such as working memory (MacPherson, Phillips, and Della Sala 2002) Working memory mediates the encoding of information in long-term memory and the conscious retrieval of recent events (Park and Gutchess 2004) Beginning at approximately age 60, people may also experience a reduction in their explicit memory, the form of memory that makes it possible to retrieve pieces of information and their sources consciously (e g , remembering an advertisement for a car manufacturer, when it was seen, and where it appeared) For example, the free recall of a series of words or a text declines significantly with age (Zelinsky and Burnight 1997) Working memory also enables people to manipulate several pieces of information simultaneously to compare them (Mather 2003), and with their depleted working memory, older people may avoid cognitive efforts, such as a comparison of alternative choices, by relying on facilitation heuristics For example, Johnson (1990) measures the use of a noncompensatory intra-attribute heuristic to facilitate the evaluation of different car options, and Cole and Balasubramanian (1993) measure the more frequent choice of the first satisfying option when a problem is made more complex In line with these theories, an interviewee explained that she considered only one brand to keep the decision process simple, she then made a spontaneous mention of her age, stating that "the older one gets, the less one wants to make one's life difficult with this kind of thing"

Sorce (1995) also suggests that older people often rely on a store loyalty or an advice-seeking heuristic, and we encountered two examples of these heuristics An interviewee mentioned a classical heuristic when she indicated that she had chosen a Mercedes-Benz because "of the brand reputation" Another interviewee combined two heuristics She had chosen a Renault "because her husband would have chosen a Renault" Her husband had relied on a politically based heuristic to make a choice "[Renault] was owned by the French state at the time, and my husband thought it was nice to buy a car from them" She continued to rely on that same heuristic, though Renault is no longer owned by the state Finally, Yoon (1997) shows that heuristic inference facilitates the recognition of television programs Her theoretical analysis develops the heuristic of schematic information processing, which consists of relying on known schemas rather than on a new detailed analysis

These aspects of cognitive decline should have an impact on the variables that we analyze For a complex, durable good, such as a car, consumers must decide whether to purchase when alternative choices are not physically present In addition, age is negatively correlated with fluid intelligence (i e , intelligence required for new problems and situations), but crystallized intelligence (i e , intelligence based on prior experience and learning) remains intact (Salthouse 1991) The decline of fluid intelligence is continuous, but it passes through performance thresholds, and Chasseigne, Mullet, and Stewart (1997) observe that after age 65, people have difficulty identifying an inverse relationship between indicators and a consequence[2] For example, in the car market, if a price goes down when a rebate goes up, consumers age 75 and older are unable to use this inverse relationship, even with a visual aid Therefore, the decline in working memory and fluid intelligence should decrease the number of brands, dealers, and models that older consumers consider, and it should increase their tendency to consider familiar options, which helps induce repeat purchases Older people also should rely more on decision heuristics that orient brand choice at the consideration stage without any intensive search or evaluation (Cole and Balasubramanian 1993) These effects of age appear for people age 60 and older and more strongly for people age 75 and older We summarize this discussion with a proposition, which should be tested by further experimental or survey research

> P_1 When the comparative analysis of possible options becomes cognitively more difficult, older consumers are more likely to (a) consider fewer options and (b) repeat their previous choice

Socioemotional selectivity Socioemotional selectivity theory claims that older people who perceive their time horizon as limited place greater emphasis on feelings and emotions, and their interest in new information declines They give priority to close, well-known, emotional contacts over new, informative ones (Carstensen, Isaacowitz, and Charles 1999, Isaacowitz, Charles, and Carstensen 2000) When asked to choose between potential social partners who represented three degrees of familiarity (a member of their immediate family, a recent acquaintance, and the author of a book they read), 65% of older subjects chose the most familiar social partner, whereas only 35% of younger subjects chose this option Similar results were obtained for younger people whose time horizon was artificially shortened because of, for example, an unexpected move within a week or a disease that was suddenly diagnosed as fatal (Fredrickson and Carstensen 1990) The increased importance of emotional goals influences the daily relationships of older people, such that "elderly couples often accept their relationship as it is, to appreciate what is good, and ignore what is troubling, rather than seek new solutions to problems" (Carstensen, Isaacowitz, and Charles 1999, p 167) As a result, "older people not only interact with fewer people, they interact primarily with people who are well-known to them" (Field and Minkler 1988, qtd in Carstensen, Isaacowitz, and Charles 1999, p 169)

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[2] Salthouse (1991, qtd in Chasseigne, Mullet, and Stewart 1997, p 2) quotes the following example of an inverse relationship "R and S do the opposite, Q and R do the same If Q increases, what happens to S"?

Similarly, we can analyze the relationship between older consumers and familiar dealers with which older consumers have developed a rapport over the years, especially with respect to highly involving purchases such as automobiles Several interviewees spontaneously mentioned that they had a long-lasting, special relationship with a person associated with the dealership, who was often the dealer "The dealer, he was the boss, we had a contact with the boss" This relationship can also involve other members of the dealership's staff, as the following quotes show "I knew well the one who repairs cars, their shop foreman," and "The sales girl, I've known her since she was 20 She has always been very helpful She even had my car's painting fixed for free" This connection can even extend to the dealer's family members "The dealer, he's very kind, his family, a long-established one in [this city]", "I taught catechism to his daughter", and "It's very familiar, it's very nice" These elements lead us to the following

> P_2 The longer a consumer has had a relationship with a supplier, the more likely he or she is to (a) analyze fewer options and (b) repurchase from the supplier

Socioemotional selectivity also may bias people's memory of their prior choices In an experiment, Mather and Johnson (2000) find that older people are more likely than younger people to attribute positive features to an option they had chosen and negative features to an option they had rejected[3] Accordingly, in our large-scale survey we find that older buyers are more likely to be satisfied with their previous car On a scale of 1 to 10, high scores (8 or higher) were rated by 56% of the young, 67% of the middle-aged, 78% of the young-old, and 86% of the old-old Furthermore, as we indicated previously, for a given satisfaction level, older buyers are more likely to consider the previous brand, consider nothing but the brand, and repurchase it (Figure 2) Their tendency to be more supportive of their prior choices may explain their higher brand and dealer loyalty, an extreme version of which is to consider only the previous brand and previous dealer (Figure 1, Panel C) Thus, we posit the following

> P_3 Older consumers are more likely than younger consumers to remember positive features of the previously chosen option and therefore (a) analyze fewer options and (b) repeat their previous choice

Change aversion An aversion to the risks linked to changes, even if the present solution is far from ideal, is a well-documented phenomenon in gerontology Wallach and Kogan (1961) and Botwinick (1966) asked participants to choose between two options to stay in a secure but mediocre occupation with limited prospects for a pay increase or to change to an occupation that would lead, with probability *p*, to a high salary increase and, with probability $1 - p$, to financial disaster Older subjects were markedly more likely to choose not to change, whatever the value of *p* Botwinick (1978) suggests two hypotheses to explain this resistance to change First, because of their intellectual decline, older people may avoid making decisions The preceding results corroborate this hypothesis Second, older people may avoid the risk that is associated with a bad decision, especially that which may lead to a financial risk However, Botwinick (1978) also notes that when the option not to change is not available or the more difficult option (e g , a word that is difficult to explain versus an easy one) has a higher probability of success or is more rewarding (Okun and Elias 1977), older people have a utility function similar to that of younger ones Recent laboratory studies, in which older participants selected cards in the high-reward/high-risk deck as often as younger ones did, confirm this concept (MacPherson, Phillips, and Della Sala 2002) Thus, the purchase behavior of older people could be the consequence of change aversion, which would lead them to repeat their previous choice, staying with the same brand and the same dealer is a way to avoid the complexity of a new decision, as is considering a single model For example, one interviewee stated, "I don't like to change my habits, maybe I'm loyal" All six interviewees indicated that they had been repurchasing the same brand for a long time (15–50 years) and that their relationship with the same dealer had lasted 15–40 years The discussion leads us to the following

> P_4 When the stakes associated with a potential decision become higher, older consumers are more likely to avoid the burden of making a decision by (a) repeating their previous choice or (b) analyzing only a few options

In summary, we leave aside biological aging because it explains only part of our results The other three age-related explanations converge in predicting that preference for familiar choices increases with age However, there are small differences in the three predictions Cognitive decline is a tentative explanation for all our results, cognitive decline and change aversion, but not socioemotional selectivity, predict the consideration of fewer car models, and change aversion does not predict a preference for long-established brands

Limitations and Further Research

Further research could use experiments and include other product categories, consumers who play roles other than that of the main decision maker, other stages in the decision process, or other types of data Our study is based on a large-scale, representative survey of actual car purchasers Because survey data make it difficult to delineate the effects of collinear age-related variables (Hedden and Gabrieli 2004), additional research should experimentally test our propositions Cognitive difficulty (P_1) and length of a relationship (P_2) are theoretical variables that increase naturally with age but that can be manipulated experimentally The amount at stake (P_4) can also be manipulated Finally, the biased memory of previous choices (P_3) could be studied by replicating Mather and Johnson's (2000) research and by adding measures of the number of options and whether the final choice is a repeat purchase

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[3] Participants were asked to choose between two options that were characterized by positive and negative features After the choice, participants were shown positive and negative features to attribute to each option The degree of their choice supportiveness was measured by an asymmetry score, which was calculated as follows (proportion of positive features attributed to the chosen option + proportion of negative feature attributed to the rejected option) – (proportion of negative features attributed to the chosen option + proportion of positive feature attributed to the rejected option)

In addition, our study is restricted to a specific, albeit important, purchase new automobiles Can the results be extrapolated to other purchases? We offer two important tentative explanations the reduced cognitive abilities of older respondents (cars are complex products, and the number of brands and models is enormous) and the increased aversion to change (automobile purchases are financially, physically, and socially risky) Therefore, for secondhand automobiles, which can be more risky purchases than new cars, we expect to find more brand repurchases and dealer loyalty among older buyers than among younger buyers (Note that older consumers who purchase secondhand cars are likely to be less wealthy than are those who buy new cars, and therefore they face a higher financial risk) Furthermore, we argue that our findings are likely to be replicated in other high-complexity, high-stakes categories, such as financial products, pharmaceutical drugs, trips, and so forth Javalgi, Thomas, and Rao (1992) find that older people buy more travel packages rather than organize trips themselves, though they may have more time to do so Conversely, the findings may be different, or even opposite, in categories that involve limited risk and require less information to process, such as a new yogurt flavor

A crucial characteristic of the car market is its slow changes in brands and brand shares The three leading national brands in France (i e , Renault, Peugeot, and Citroen) have existed for a century and have been sold by dealers that have remained in the same locations for decades This characteristic makes a long-term acquisition of brand knowledge and preferences possible, though biased toward long-established brands and selective expertise In many other categories, long-established brands and relative newcomers coexist We hypothesize that the preferences and actual choices of older consumers are biased toward older brands, whereas younger consumers lean toward more recent brands Similar phenomena may occur for hedonic preferences People may acquire preferences when they discover a domain for the first time, and they may keep them for life An example is provided by Holbrook and Schindler's (1994, p 414) finding that "consumers tend to form enduring preferences for cultural products [e g , movie stars] during a sensitive period," namely, late adolescence This finding has been replicated for various other categories For example, Schindler and Holbrook (2003) analyze how male consumers' preferences for car styles (evaluated from anonymous photographs) depend on the correspondence between the consumers' age and the date the car appeared on the market In agreement, Schuman and Scott (1989, p 377) state that "memories of important political events and social changes are structured by age, and adolescence and early adulthood [are] the primary period for generational imprinting of political memories " Similar effects may also occur for strictly utilitarian products, which additional research should investigate

In addition, we study individual buyers of new cars as a function of their age, but it would be interesting to determine whether the age of the person, if any, who accompanies the primary buyer (e g , friend, family member) affects purchase behavior Unfortunately, information about that person is not available from the survey

We also study actual buyers of new cars Further research might consider potential buyers, sampled before they decide whether to buy, to analyze what leads some of them to buy and others not to buy Note that our sample is representative of new-car buyers, not of the general population Among other characteristics, older buyers of new cars, compared with older nonbuyers, are more often men, have a higher average income, and, we posit, are more likely to be in good health Our results may generalize to similar buyer populations, but other populations may behave differently (Yoon 1997)

Although our study relies on a large representative sample of actual buyers, it is cross-sectional, and it is always difficult to compare the impact of age on people who belong to different cohorts, unless the cohort effect is moderated by all demographic variables (Schaie 1965, Whitbourne 1996), as we did in this study However, it would be worthwhile to replicate the results using a series of similar samples collected at regular intervals to analyze the aging versus cohort effects In addition, other research methods—such as ethnographic research of older buyers and nonbuyers before the decision is made whether to purchase, studies based on consumer panels, which are inappropriate for car purchases but useful for frequently purchased goods, and experiments that measure psychological variables—could enrich our findings

Managerial Implications

Our research has immediate implications not only for the current marketing environment but also for emerging environments For example, we observed a tendency of older car consumers to repeat purchase and to limit their purchase process to a few brands, giving a privileged status to the previous brand and long-established brands This predisposition makes it more efficient for managers of certain brands and less efficient for managers of others to target older consumers Nevertheless, some managers are suspicious of the greater loyalty of older consumers because they fear the perception that their brands have aged In addition, older consumers may be open to innovations that make life easier for them, such as new ergonomic features Along this line, Ford uses drivers wearing "third age suits" to pretest its new cars (Krebs 2000, p 52) Brands may benefit both from older buyers' loyalty and by introducing innovations in their models, which would enable them to maintain a modern image

Potential interpretations of our cognitive decline, socioemotional selectivity, and change aversion propositions also lead to specific suggestions for marketing actions Managers should provide older consumers with reassuring information in an easy-to-acquire format, such as testimonials by well-known spokespeople, advertisements that feature simple sentences, slow speech, and large fonts, and easily accessible Web sites Well before the product search begins, the brand should establish trustful, long-term relationships with older buyers through potential advisors Preemptive actions, such as being the first brand to suggest itself as a possible choice, may be particularly effective for older consumers The product or service should also include well-known features or characteristics that help locate the brand or model within already memorized frameworks and avoid radical frame changes In this vein, we question recent trends toward renaming well-established companies or products, which removes the support provided by well-ensconced references and forces older consumers to confront what may appear to be new categories Similarly, easily recognizable patterns should be preserved for packages, logos, models, and variety names For example, Peugeot has used the same pattern to identify its car models for a century a three-digit number with a zero in the middle (e g , 305, 607) The first digit identifies the size of the car (1 for very small cars, 6 for the largest cars, and 9 for a prototype entered at Le Mans), and the last digit describes successive generations and increases slowly (3 in the 1950s, 4 in the 1960s, and 7 in the late 1990s and early 2000s) This pattern enables older consumers to understand the positioning of, for example, a newly appearing 207 model instantly and in a perfectly mastered, crystallized framework

In the car market, the Internet represents an important change Ratchford, Lee, and Talukdar (2003) find that Internet users are younger and search more information than do nonusers, but they would have searched even more had they not used the Internet Thus, it appears that the Internet, though it makes a search easier, does not stimulate greater search Therefore, we expect that older buyers will not search for as much information as will younger buyers

Finally, in response to new European regulations, in October 2003, France officially switched from its decades-old system of exclusive brand dealerships to multibrand dealerships (though the implementation has begun slowly) According to socioemotional selectivity theory, personal relationships with a dealer may become more important than the relationship with a brand because of this change However, consistent with arguments based on cognitive decline and decision aversion, the brand will still play a major role by offering a cognitive heuristic that facilitates choice

Appendix A
Sample Structure

Variables	**Weighted Distribution[4] (%)**
Age Groups	
18–39	32
40–59	39
60–74	25
75 and above	4
Education	
Primary	37
High school	24
Higher	39
Income	
Lower third	42
Medium third	22
Upper third	36
Gender	
Women	28
Men	72
Occupation (at 18–55)	
Workers, employees	30
Intermediary (middle management and trade staff)	25
Managers, executives, professionals	8
Age 55 and above	37
City Size	
Small Fewer than 5000 inhabitants	33
Medium-sized 5000–100,000 inhabitants	32
Large 100,000 or more inhabitants	35
Marital Status	
Living alone	24
In couple	76
Retired (defined only for respondents aged 55–65)	
Retired	81
Active	19

Appendix B
Impact of Expertise and National Preference

Impact of Expertise

We measured expertise on a three-item scale "I keep informed about news of the automobile market," "I could give good advice on automobiles if I was asked to," and "I know a lot about cars" (α = 74) We measured experience by the number of cars previously bought We used three measures of prepurchase information seeking number of information sources used, number of brands considered, and number of times the buyer test drove the car As we predicted, preliminary regressions indicate that expertise increases with age and is mediated by experience Age is a significant predictor of expertise when it is the only explanatory variable, but it becomes nonsignificant when experience (which is also significant) is included in the equation Therefore, we use age and expertise as predictors of prepurchase information search, with the following results

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[4] We use the weights to replicate the brand and model market shares observed in the French market (N = 28,913, we analyze replacement purchases only)

(B1) Number of information sources =

$$3\ 143 \quad + \quad 00537 \text{ Expertise} \quad - \quad 0225 \text{ Age}$$
$$(t = 17\ 80) \qquad (t = 5\ 31) \qquad (t = -6\ 93)$$
$$R^2 = 066 \qquad F(2, 1005) = 35\ 45$$

(B2) Number of brands considered =

$$3\ 961 \quad + \quad 00134 \text{ Expertise} \quad - \quad 0272 \text{ Age}$$
$$(t = 17\ 89) \qquad (t = 1\ 55) \qquad (t = -9\ 80)$$
$$R^2 = 088 \qquad F(2, 1005) = 48\ 35$$

In a logistic regression in which the dependent variable is whether the buyer test drives a car,

(B3)

$$-\ 694 \quad + \ 0041 \text{ Expertise} - \quad 0149 \text{ Age}$$
$$(\chi^2 = 7\ 71) \qquad (\chi^2 = 8\ 11) \qquad (\chi^2 = 10\ 12)$$
$$\text{Overall } \chi^2 = 17\ 18 \text{ (d f = 2)}$$

The results provide a consistent pattern Age significantly decreases information search, whereas (self-assessed) expertise increases information search We find two significant results for information sources and test drive and a directional but nonsignificant result for the number of brands considered

Impact of National Preference

Two items ("I always buy French cars," and "I buy nothing but foreign brands") provide a brief scale of national preference for cars with low but acceptable reliability (α = 58) This measure of national preference is not correlated with age (r = 025, n s) In a logistic regression, both national preference and age have significant but separate effects on the purchase of a national brand

(B4)

$$1\ 258 \quad + \ 479 \text{ National preference} + \quad 0027 \text{ Age}$$
$$(\chi^2 = 37\ 19) \qquad (\chi^2 = 49\ 00) \qquad (\chi^2 = 38\ 71)$$
$$\text{Overall } \chi^2 = 92\ 93 \text{ (d f = 2)}$$

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Michael Tsiros & Carrie M. Heilman

The Effect of Expiration Dates and Perceived Risk on Purchasing Behavior in Grocery Store Perishable Categories

In this article, the authors examine consumers' behavior with respect to expiration dates for grocery store perishable products A better understanding of such behavior can both guide efforts to educate consumers about the risks associated with perishables that are approaching their expiration dates and help managers implement effective promotional strategies for these products throughout the course of their shelf lives Both of these approaches can help reduce waste due to spoilage

In the current era of "super–grocery stores," it is no longer branded items that bring in business but rather full-service delis, fresh baked goods, premium meats, and elaborate arrays of produce Simply stated, perishable products drive grocery store traffic According to Glen Terbeek, managing partner of Anderson Consulting, "In today's world, branded grocery items are the same everywhere, Coke is Coke and Tide is Tide, but perishables and their presentation are unique," and such presentation draws consumers into the store (Hennessy 1998, p 63)

The importance of perishables for store profitability and store image has been supported by several market facts First, in 1999, sales of perishable goods rose 4 5% and accounted for 69 4% (approximately $305 billion) of all retail food sales and just more than 50% of all supermarket retail sales (*Supermarket Business* 2000) Second, produce represents 12 7% of total store sales and is the second most profitable category behind frozen foods (Berner 1999) Third, meat and produce tend to be the departments on which consumers base their value judgments about stores (Kerin, Jain, and Howard 1992) These trends may explain why grocery stores advertise 19 varieties of peppers and stock more than 400 produce items (Turcsik 2003)

Despite their importance, perishable products are difficult to manage because of their random weights, lack of specific Universal Product Codes for different product variations, and different forms of sale (e g , raw, semiprepared, fully prepared), to name just a few issues Perishables are so complex that many retailers are unable to implement any type of category management strategies for them (Litwak 1997) However, according to the Blattberg, Chaney & Associates consulting firm, "the key to successful category management (of perishables) is to understand how the consumer makes category decisions" (Litwak 1997, p 166) Such understanding could lead to actions that benefit grocery store managers, consumers, and society as a whole

A better understanding of consumers of perishable goods would enable managers to implement discounting policies that reduce shrinkage (waste due to spoilage), a major problem in perishable categories Departments such as produce, bakery, and meat lose approximately 4 5% of their goods to spoilage (compared with 2% overall), which can cost a grocery store $70,000–$340,000 a year, depending on the size of the store (*Supermarket News* 1997) Furthermore, a grocery store may be able to increase its profits by as much as 15% by minimally reducing the shrinkage of perishable goods (Hennessy 1998) Discounting aging perishables may be an effective way to accomplish this goal, especially in light of evidence that the short- and long-run effectiveness of price promotions is greater for perishable goods than for other categories (Nijs, Dekimpe, and Steenkamp 2001) In addition, discounting perishables would benefit consumers by enabling them to make tradeoffs between buying a more expensive but fresher item and buying one that is discounted but may be perceived as riskier because of its approaching expiration date (though it is still safe to consume) This policy could also build trust between consumers and managers who avoid selling products that are close to their expiration dates at full price In the end, discounting perishables would benefit society as a whole by reducing the unnecessary waste that spoilage causes each year Despite these benefits, however, it seems difficult and perhaps imprudent to implement such discounting strategies without a better understanding of consumers' awareness and interpretation of expiration dates, as well as the way that consumers' willingness to pay (WTP)

Michael Tsiros is Associate Professor of Marketing, University of Miami, and Tassos Papastratos Research Associate Professor of Marketing, Athens Laboratory of Business Administration, Athens, Greece (e-mail tsiros@miami edu) Carrie M Heilman is Assistant Professor of Commerce, McIntire School of Commerce, University of Virginia (e-mail heilman@virginia edu) The authors thank Tom Jansen, a grocery store manager in the St Louis, Mo, area for his invaluable insights into the issues studied herein They also thank four anonymous *JM* reviewers whose comments improved the contributions of this article

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for a perishable varies throughout the course of the product's shelf life.

A better understanding of consumer behavior with regard to perishable categories could also aid efforts to educate consumers about food dating (the dates found on product packaging). Currently, there is ambiguity about the usage and regulations of what consumers often refer to as "expiration dates." Except for infant formula and baby food, the Food and Drug Administration does not require manufacturers to date their products, nor does it have federal regulations governing dating (*Tufts University Health & Nutrition Letter* 1997). Therefore, food dating is a voluntary process typically provided in one of three forms: (1) "Best before," which indicates the date after which a product is no longer of its "best" quality, generally is used for products such as baked goods, cereals, snacks, and some canned foods; (2) "use by," which indicates the date after which a product is no longer of sufficient quality and should not be consumed, is used for products such as eggs, yeast, and refrigerated dough; and (3) "sell by," which indicates the last day a product should be sold (though most remain safe to eat up to seven days past this date or longer if stored in a freezer), is most commonly used with meat, seafood, poultry, milk, and bread. Because of the different forms of product dating, misconceptions among consumers about their meaning is common.[1]

However, the problem is not limited to expiration dates;[2] it applies to food labels in general. A recent Food Standard Agency survey (Whitworth 2001) reports that more than one-quarter of all consumers find labels difficult to understand, and one-third do not know the significance of "use by" or "best before" dates. Although approximately 60% of consumers claim that they check food labels and expiration dates on food packages, only one-third of them know what to do with food when it is one day past its "use by" date (Whitworth 2001). As the findings show, research is necessary to understand consumers' awareness and interpretation of expiration dates to implement programs that could change misconceptions about and behavior with respect to product dating.

Despite this evidence, perishable products have received little or no attention in the marketing literature (Krider and Weinberg 2000). In response, our main objectives are to examine (1) consumers' awareness of expiration dates, (2) their WTP for a perishable throughout the course of its shelf life, and (3) the role that risk plays in the choices consumers make when buying perishable goods.[3] Whereas studies have investigated the influence of perceived risks on brand preference (Dunn, Murphy, and Skelly 1986), product classification (Murphy and Enis 1986), product liking (Cardello 2003), and attitudes toward pesticide use on produce (Huang 1993), our research is the first to investigate the impact of perceived risks and expiration dates on consumer behavior in grocery store perishable categories.

We develop a set of hypotheses that we test empirically through a survey of consumers' perceptions and behaviors with respect to the following important perishable categories: chicken, beef, milk, yogurt, lettuce, and carrots. We use products from the meat and poultry, fresh produce, and dairy categories because of the large percentage of all grocery store perishable sales in these categories: 30.4%, 22.5%, and 16.9%, respectively (*Supermarket Business* 2000). We chose two products from each perishable category to obtain insights into behavior both across products and within product types. Our findings support many of the hypotheses, and we use the findings to make recommendations to managers of grocery store perishable goods and to develop a research agenda for further studies in these under-researched but important categories.

Literature Review

To date, much of the research on perishable goods has come from the operations research literature and has focused on optimizing pricing, ordering, and restocking strategies for aging goods, most of which do not appear in grocery stores (e.g., fashion goods, broadcast spots). In Table 1, we present a subset of these studies and summarize the problems investigated, the characteristics of the categories studied, and the main findings.

Although these studies address some issues relevant to managers of perishable goods, such as pricing, restocking, and ordering policies, the characteristics of the products studied differ from consumable grocery store perishables, which makes the findings from these studies impractical for managing such products. For example, a grocery store perishable has a relatively short shelf life, typically one to three weeks. Therefore, a manager's ability to update information throughout the life of the product, as is done in many of the operations research studies, is limited. In addition, the quality of grocery store perishables decreases until they eventually spoil and can no longer be sold, unlike fashion goods, for which the utility of the product, though it may decay over time, never reaches zero, or broadcast spots, for which the value of the good may actually increase over time if the expected number of viewers increases before the sale of the broadcast spot (e.g., when two teams from big, metropolitan cities advance to the Super Bowl). Because grocery store perishables spoil, managers must understand consumers' WTP across the shelf life of these products to be able to sell them before they go bad. However, the most important distinction between our research and that of the operations

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[1] We identified consumers' misconceptions of how grocery store perishables age during their shelf lives in a pilot study in which the majority of consumers (61%) perceived that "sell by" dates represent the last day on which the product should be consumed rather than sold. Furthermore, a large proportion of consumers (42%–82%, depending on the category) reported the misconception that the quality of a perishable deteriorates continuously from the time it is put on the shelf. The results are available from the authors.

[2] We use the term "expiration date" to denote "sell by," "best before," and "use by" dates.

[3] We thank two anonymous reviewers for suggesting perceived risk as an important driver of behavior in perishable goods categories.

TABLE 1
Summary of Selected Research on Perishable Goods from the Operational Research Literature

Reference	Problem Investigated	Category Characteristics/ Assumptions	Findings/Contribution
Hahn, Hwang, and Shinn (2004)	Use a period-review inventory model under "last-in-first-out" and "first-in-first-out," issuing policies to examine retailers' operating policies for perishables	Products for which the supplier agrees not to buy back unsold products but provides the retailer some discount on the wholesale price	Cases in which the retailer and supplier are better or worse off because of a no-return policy
Abad (2003)	Presents an analytical model for pricing and lot size decisions	Perishable goods under finite production, exponential decay, and partial backordering	When demand is price sensitive, pricing and production are related, and the retailer may need to backlog demand to avoid high costs due to deterioration
Chun (2003)	Studies (1) optimal product pricing based on demand rate, buyer preference, and length of sales period and (2) the optimal ordering quantity that maximizes the seller's total expected profit	For perishable commodities for which demand is represented by a negative binomial, the seller must determine the price for several units of a perishable with a limited shelf life, and any product not sold at the end of the selling period is disposed of at a lower price	Presents superior solutions to those previously found in the literature
Li (2001)	Uses a series of linear programming models to study optimal pricing decisions	Nonstorable perishable goods or services (e.g., airline seats, hotel rooms)	Shows that there is an optimal pricing policy of, at most, three prices
Hariga (1997)	Presents analytical solution methods to determine optimal replenishment schedules	Exponentially decaying items and perishable products with fixed lifetimes	Provides two efficient solution methods that determine the optimal replenishment schedules for the types of products studied
Subrahmanyan and Shoemaker (1996)	Present an optimal pricing and restocking model that allows demand to be updated throughout the course of the life of the product	Products with uncertain demand, a limited selling season, and inventory left at the end of the selling season are greatly reduced in value (e.g., fashion goods, toys)	Present a model that offers advantages for new items with the characteristics studied
Lodish (1980)	Presents a dynamic model for pricing and ordering that accounts for inventory, anticipated demand during current and future periods, and future pricing decisions	Products whose value to the customer changes over time (e.g., broadcast spots)	Provides modelers an easily implemented framework for structuring and solving dynamic pricing problems

research literature is that most of the studies in Table 1 make assumptions about consumer effects in their models. In contrast, we explicitly study consumers' perceptions and behavior in grocery perishable categories through a survey study.

The few studies that have considered grocery store perishable goods and goods with similar characteristics have modeled optimal inventory policies (Giri and Chaudhuri 1998; Hariga 1997; Khouja 1996), pricing policies (Gold 1981; Rajan and Steinberg 1992), ordering and issuing (restocking) policies (Fujiwara, Soewandi, and Sedarage 1997), and the impact on store choice (Krider and Weinberg 2000). Although the management of goods such as fresh meat, poultry, and dairy depends on many of the factors captured in these studies (e.g., seasonality, inventory, buyback deals), an understanding of consumers' awareness of, perceptions of, and behavior with respect to expiration dates is missing. A study that is similar in spirit to ours is Huang's

(1993), which addresses the effect of risk perceptions of pesticide use on consumers' WTP for residue-free produce However, that study does not include expiration dates, and it focuses solely on perishables that use pesticides, in contrast, we focus on a broader range of grocery perishables that includes meat, poultry, dairy products, and produce

Our study is also different from those mentioned previously in that we explicitly focus on consumers' perceptions and behaviors in specific, important grocery store perishable goods categories Therefore, our study represents the only work to explicitly investigate consumers' awareness of expiration dates, their WTP for a perishable as it ages, and the influence of perceived risk on such behaviors

Hypotheses Development

During the past 15 years, perishable food scares—such as salmonella in eggs, milk, and poultry, listeria in pate and certain soft cheeses, and bovine spongiform encephalopathy (more commonly known as mad cow disease) in meat—have caused health concerns among consumers and have brought about significant changes in their purchasing habits (Mitchell 1998) For example, the retail volume sales of beef and veal dropped 63% in 1996 after a public announcement linked bovine spongiform encephalopathy to Creutzfeldt-Jakob disease, a fatal brain disease in humans, and in 1989, retail sales of eggs dropped 21% after an outbreak of salmonella (Yeung and Morris 2001) Furthermore, these scares have caused investors to devalue stocks of companies that sell related products (e g , McDonald's, Jack in the Box, Outback Steakhouse) by up to 5% (Shell 2003) The main factor driving the behavior of consumers and investors in these situations is the perceived risk associated with purchasing and consuming an unhealthy perishable good

Perceived risk, defined as the expected negative utility associated with the purchase of a particular brand or product (Dunn, Murphy, and Skelly 1986), influences consumers not only for categories affected by highly publicized food scares but also for everyday, common purchase decisions As a result, consumers take actions to lower the perceived risk associated with a purchase by (1) shifting or postponing their purchase, (2) purchasing well-known brands, (3) seeking advice or endorsement from a trusted source (Yeung and Morris 2001), or (4) in the case of perishable goods, searching for visual and other cues of freshness, such as expiration dates in the case of perishable goods

The types of perceived risks that influence consumer decision making include functional, performance, physical, psychological, social, and financial (Greenleaf and Lehmann 1995, Havlena and DeSarbo 1990, Jacoby and Kaplan 1972, Roselius 1971) (for definitions of these types, see Table 2) The influence of the different types of risk on shopping behavior varies depending on the brands considered or the categories of interest For example, Dunn, Murphy, and Skelly (1986) study the influence of perceived risk on preferences for generic, store, and national packaged-goods brands and find that social risk plays a minor role compared with financial and performance risks Alternatively, Murphy and Enis (1986) classify product categories on the basis of consumers' shopping effort and price risk dimensions They report that convenience goods, which include produce and other grocery staples, tend to rank lower than preference, shopping, and specialty goods in terms of the effect of effort and risk on behavior However, recent evidence demonstrating the importance of perishables for store choice and shopping experience and the flood of recently publicized food scares involving perishable goods may lead to different results than those found approximately 20 years ago

Frequency of Checking Expiration Dates

Prior studies have shown that as the risks associated with a product increase, so does consumers' desire for information before they make a purchase (Blackwell, Miniard, and Engel 2001, Dowling and Staelin 1994, Greenleaf and Lehmann 1995) In an attempt to reduce the risks, consumers may search for product attributes and information before making a purchase Because a relevant piece of information for a perishable good is its expiration date, we propose the following

TABLE 2
Dimensions of Perceived Risk Associated with Shopping Behavior

Dimension of Risk	Definition	Cited Study
Functional risk	The product does not perform as expected	Jacoby and Kaplan (1972)
Performance risk	The product does not meet standards of quality	Dunn, Murphy, and Skelly (1986), Roselius (1971)
Physical risk	Consumers' safety in using the product	Jacoby and Kaplan (1972)
Psychological risk	Poor product choice harms consumers' ego	Jacoby and Kaplan (1972), Roselius (1971)
Social risk	Product choice may result in embarrassment before family or friends, others will think less of a person as a result of a poor product choice	Dunn, Murphy, and Skelly (1986), Jacoby and Kaplan (1972), Roselius (1971)
Financial risk	The product is not worth the financial price	Dunn, Murphy, and Skelly (1986), Jacoby and Kaplan (1972), Roselius (1971)

H_1 Consumers who perceive high levels of risk associated with a perishable product check its expiration date more frequently than do consumers who perceive low levels of risk (positive main effect)

In Table 2, we define the risks included in our study As we mentioned previously, no theory exists in the literature about the relative importance of these risks in any context, let alone in the context of perishable grocery store goods However, we expect that functional, performance, and physical risks dominate the other risks (psychological, social, and financial) because of their relationship with product quality and the highly publicized and important health risks associated with many of the products in our study

Consumer research recognizes familiarity and expertise as characteristics that influence consumers during the various stages of their decision-making process (Bettman and Park 1980) Consumers with greater category experience are better able to search out, encode, and recall information than are those with less experience (Alba and Hutchinson 1987, Johnson and Russo 1984, Maheswaran and Sternthal 1990) Because expiration dates provide valuable information about a product's remaining shelf life, we expect that consumers with greater category experience are better able and more likely to search out expiration dates Furthermore, as their category experience increases, the impact of uncertainty and risks associated with a perishable should decrease because consumers rely more on the expertise that they have accumulated in the category Therefore, we expect that consumers' increased category experience dampens the impact of perceived risks on the frequency of checking expiration dates Alba and Hutchinson (1987, p 411) define familiarity and expertise as "the number of product related experiences accumulated by the customer" Therefore, we use household consumption rate as a proxy for category experience and propose the following

H_2 Consumers from households with high consumption rates of a perishable product check its expiration date more frequently than do consumers from households with low consumption rates (positive main effect)

H_3 The effect of perceived risk on how frequently consumers check expiration dates is smaller for consumers from households with high consumption rates than for those from households with low consumption rates (negative interaction effect)

Consumers can take measures to stop or extend the aging process of most perishables, such as freezing, cooking, or using the product immediately In such situations, the information that the expiration date provides is of less value to consumers because the product is less likely to spoil Therefore, such consumers may be less likely to seek out expiration information Similarly, stopping the aging process should reduce the impact of the risks associated with spoiling, and the effect of perceived risks on the frequency of checking expiration dates should be dampened Thus

H_4 Consumers who plan to stop the aging process of a perishable product check its expiration date less frequently (negative main effect)

H_5 The effect of perceived risk on how frequently consumers check expiration dates is smaller for consumeis who plan to stop the aging process of a perishable product (negative interaction effect)

WTP for a Perishable Throughout the Course of Its Shelf Life

When consumers buy a perishable, they must consider the likelihood that the product will spoil As the likelihood of spoilage increases, the value of the product, and thus consumers' WTP for it, should decrease Because the number of days before the product reaches its expiration date is a measure of the likelihood of spoilage, we expect that as the product approaches its expiration date and the number of days decreases, WTP for the product decreases

H_6 Consumers have a higher WTP for perishable products that have more days before their expiration date (positive main effect)

The inverse relationship between perceived risk and WTP has been documented for products that use pesticides (Eom 1994, Huang 1993) In addition, when the risks of failure are high, consumers will trade some risk by reducing the resources that they allocate to acquire the product (Huang 1993, Yeung and Morris 2001) Therefore, we propose that as the perceived risks associated with a perishable increase, consumers' WTP decreases in exchange for accepting a greater risk

H_7 Consumers with higher perceptions of risk for a perishable product have a lower WTP (negative main effect)

However, risks may be consumer specific For example, perishables consumed by households with higher consumption rates are less likely to spoil, and therefore their value to such consumers is greater than it is to households with lower consumption rates, especially as the product approaches its expiration date As a result, household consumption rate should have a direct and positive impact on WTP, both overall and with respect to how WTP decreases as the expiration date approaches Furthermore, as the household consumption rate increases, the negative impact of risk perceptions on WTP should decrease because the risk of spoilage is reduced Thus, we propose the following

H_8 Consumers from households with higher consumption rates have a higher WTP (positive main effect)

H_9 The effect of the number of days before the expiration date on consumers' WTP is smaller for consumers from households with high consumption rates than for those from households with low consumption rates (positive interaction effect whereby WTP decreases at a slower rate as the number of days decreases)

H_{10} The effect of perceived risk on consumers' WTP is smaller (less negative) for households with high consumption rates than for those with low consumption rates (positive interaction effect whereby the negative effect of risk is dampened)

Finally, in cases in which consumers plan to stop the aging process of a perishable, because the product is less likely to spoil, its value to consumers should be greater Thus, stopping the aging process should have a direct and positive impact on WTP, both overall and with respect to how WTP decreases as the expiration date approaches. Furthermore, stopping the aging process should lower the impact of the perceived risks associated with the perishable on WTP.

H_{11}: Consumers who plan to stop the aging process of a perishable product have a higher WTP (positive main effect).

H_{12}: The effect of the number of days before the expiration date on consumers' WTP is smaller for consumers who plan to stop the aging process of a perishable product (positive interaction effect whereby their WTP decreases at a slower rate as the number of days decreases).

H_{13}: The effect of perceived risk on consumers' WTP is smaller (less negative) for consumers who plan to stop the aging process of a perishable product (positive interaction effect whereby their WTP decreases at a slower rate).

In Table 3, we summarize these hypotheses and the variables we use to test them.

Empirical Research

We conducted a survey to test our hypotheses with regard to consumer behavior in six perishable categories with printed expiration dates on their packaging: prewashed/precut lettuce, prewashed/precut carrots, milk, yogurt, chicken, and beef. A convenience sample of 300 consumers participated in our study, for which the only screening criterion was that the respondent did a substantial amount of grocery shopping for his or her household. Participants came from two large metropolitan areas in the Midwest and Southeast United States. To assess consumers' WTP throughout the course of the products' shelf life, we distributed three versions of the survey in which we inquired about participants' WTP for a perishable with seven (85 surveys), four (93 surveys), or one (92 surveys) day(s) remaining before it reached its expiration date. After we cleaned the data of missing observations, there were 270 usable surveys. We report summary statistics about consumers' perceptions of the products in Table 4.

A majority of consumers (69%–84%, depending on the product category) believed that the quality of perishables deteriorates throughout the course of their shelf life, though retailers maintain that the quality remains relatively constant until the product passes its expiration date. This finding suggests an opportunity for retailers to smooth demand throughout the course of the products' shelf life by educating consumers about the actual risks of purchasing a product close to its expiration date and about the way perishables age over time. However, because such efforts might be received with skepticism, it would be in retailers' best interests to obtain the support of the Center for Food Safety and Applied Nutrition, which distributes printed materials that describe food labels, to encourage cookbook authors and food editors to emphasize food safety, and to disseminate public service announcements by all media (Hunter 1994). However, until such coordination occurs, discounting products as they approach their expiration dates may be the most viable strategy.

Model Specification

We conducted an exploratory factor analysis of the six risk dimensions to determine if they could be reduced to fewer constructs. We used a principal components analysis with Varimax rotation to obtain the factor loadings (oblique rotation gave similar results). In all six categories, a two-factor solution, in which both factors had eigenvalues greater than 1 and the remaining factors were less than 1, provided the best fit. We report the results of this analysis in Table 5.

For all six products, functional, performance, and physical risks load more heavily onto the factor that we label "product quality risk" (PQR), and psychological, social, and financial risks load more heavily onto the factor we label "personal risk" (PR). The PQR factor captures the perceived risks associated with product quality as a perishable approaches its expiration date and the associated health risks, and the PR factor captures risks associated with the negative emotions a consumer experiences when a product fails, such as the impressions others form about the consumer, the way the consumer feels about him- or herself, and the frustration of a financial loss. Using the results from Table 5, we recast the data to create PQR and PR. Although both models (two- and six-factor risk) provide similar results, for parsimony we use the two-factor model to capture the perceived risks associated with perishables. We also include a set of consumer characteristics in an exploratory effort to assess their influence on the frequency of checking expiration dates and consumers' WTP. We used the following estimated equations to test our hypotheses:

$$
\begin{aligned}
(1)\ \text{Freq\_Check}_{ij} = {} & \beta_0 + \beta_1(\text{PQR}_{ij}) + \beta_2(\text{PR}_{ij}) + \beta_3(\text{HHConsume}_{ij}) \\
& + \beta_4(\text{HHConsume}_{ij} \times [\text{PQR}_{ij} + \text{PR}_{ij}]) \\
& + \beta_5(\text{Stop}_{ij}) + \beta_6(\text{Stop}_{ij} \times [\text{PQR}_{ij} + \text{PR}_{ij}]) \\
& + \beta_7(\text{Sex}_i) + \beta_8(\text{Age}_i) + \beta_9(\text{Income}_i) \\
& + \beta_{10}(\text{FullTime}_i) + \beta_{11}(\text{HHSize}_i) + \varepsilon_1,
\end{aligned}
$$

and

$$
\begin{aligned}
(2)\qquad \text{WTP}_{ij} = {} & \beta_0 + \beta_1(\text{Days}_j) + \beta_2(\text{PQR}_{ij}) + \beta_3(\text{PR}_{ij}) \\
& + \beta_4(\text{HHConsume}_{ij}) \\
& + \beta_5(\text{HHConsume}_{ij} \times \text{Days}_j) \\
& + \beta_6(\text{HHConsume}_{ij} \times [\text{PQR}_{ij} + \text{PR}_{ij}]) \\
& + \beta_7(\text{Stop}_{ij}) + \beta_8(\text{Stop}_{ij} \times \text{Days}_j) \\
& + \beta_9(\text{Stop}_{ij} \times [\text{PQR}_{ij} + \text{PR}_{ij}]) + \beta_{10}(\text{Sex}_j) \\
& + \beta_{11}(\text{Age}_i) + \beta_{12}(\text{Income}_i) + \beta_{13}(\text{FullTime}_i) \\
& + \beta_{14}(\text{HHSize}_i) + \varepsilon_2,
\end{aligned}
$$

where j indicates the category of interest (i.e., 1–6), $\text{Sex}_i = 1$ if consumer i is male and 0 if otherwise, $\text{Age}_i = 1$ if consumer i is older than age 45 and 0 if otherwise, $\text{Income}_i = 1$ if the household income for consumer i is greater than \$50,000 and 0 if otherwise, $\text{FullTime}_i = 1$ if consumer i works full time and 0 if otherwise, HHSize_i is the number of people living full time with consumer i, and ε_1 and ε_2 are random error terms. We defined the remaining variables previously in Table 3. We determined the cutoffs for each

TABLE 3
Summary of Hypotheses, Variable Definitions, and Variable Measurement

	Dependent Variable	Independent Variable	Predicted Sign	Question Used to Capture Construct	Scale
H_1	Frequency of checking[a]	Functional risk	+	"How likely is it that the following product will not meet your expectations as it approaches its expiration date?"	1 = "very unlikely," 5 = "very likely"
H_1	Frequency of checking[a]	Performance risk	+	"How likely is it that the quality of the following product gets worse as the product approaches its expiration date?"	1 = "very unlikely," 5 = "very likely"
H_1	Frequency of checking[a]	Physical risk	+	"How likely is it that consuming a spoiled product of the following grocery item may lead to a health risk?"	1 = "very unlikely," 5 = "very likely"
H_1	Frequency of checking[a]	Psychological risk	+	"How likely are you to think less of yourself as an experienced shopper if you were to buy the following grocery item and then find that it did not meet your standards of quality?"	1 = "very unlikely," 5 = "very likely"
H_1	Frequency of checking[a]	Social risk	+	"How likely would guests in your home be to think less of you for serving them a poor quality product?"	1 = "very unlikely," 5 = "very likely"
H_1	Frequency of checking[a]	Financial risk	+	"How likely would you be to feel financial angst from paying for the following product and then having it not perform up to its expectation?"	1 = "very unlikely," 5 = "very likely"
H_2 H_3	Frequency of checking[a]	HHConsume HHConsume × risk[c]	+ –	"How often do you purchase in the product category in an average month?"	0 = "never," 4 = "four or more times/month"
H_4 H_5	Frequency of checking[a]	Stop Stop × risk[c]	– –	An indication of whether the consumer plans to stop the aging process (e.g., use, freeze) of the perishable on arriving home	1 = "use or freeze," 0 = "otherwise"
H_6	WTP[b]	Days	+	The number of days remaining before the product reaches its expiration date	Days = 7, 4, or 1
H_7	WTP[b]	Functional risk	–	See H_1	See H_1
H_7	WTP[b]	Performance risk	–	See H_1	See H_1
H_7	WTP[b]	Physical risk	–	See H_1	See H_1
H_7	WTP[b]	Psychological risk	–	See H_1	See H_1
H_7	WTP[b]	Social risk	–	See H_1	See H_1
H_7	WTP[b]	Financial risk	–	See H_1	See H_1
H_8 H_9 H_{10}	WTP[b]	HHConsume HHConsume × days HHConsume × risk[c]	+ + +	"How often do you purchase in the product category in an average month?"	0 = "never," 4 = "four or more times/month"
H_{11} H_{12} H_{13}	WTP[b]	Stop Stop × days Stop × risk[c]	+ + +	An indication of whether the consumer plans to stop the aging process (e.g., cook, use, freeze) of the perishable on arriving home	1 = "cook, use, or freeze," 0 = "otherwise"

[a] "How often do you check for an expiration date when buying each of the following products?" 1 = "never," 5 = "always."

[b] "What is the most you would be willing to pay for product j if it were due to expire in (7, 4, or 1) days?" (divided by shelf price).

[c] In the interest of space, we use "risk" here to represent an interaction with all risk variables. When estimating the model, we included a separate term to capture the interaction of HHConsume and Stop with all risk variables in the model.

TABLE 4
Summary Statistics About the Product Categories Investigated

	Average Shelf Life (Days)	Average Retail Price ($)	Aware of the Existence of Expiration Dates (%)	"Always"/ "Usually" Check Expiration Dates (%)	Perception of Store Quality Would Decrease if the Store Were to Discount Perishable Goods (%)	Believe Quality Deteriorates as the Product Approaches Its Expiration Date (%)
Precut/prewashed lettuce	10	2.49	53	42	44	84
Milk	14	2.70	99	93	47	84
Chicken breast	7	2.99	80	74	46	82
Precut/prewashed carrots	21	1.69	35	29	40	69
Yogurt	21	.62	87	70	44	74
Beef	7	2.68	78	59	47	84

variable from a median split analysis. To normalize WTP across categories, we define it as the consumer's WTP for the perishable divided by the original shelf price.[4] We present summary statistics for the variables in Equations 1 and 2 in Table 6. We also tested alternative functional forms of the variables in the model (e.g., linear, log-linear, curvilinear). In the next section, we present the results of the best-fitting models.

Results

To test H_1–H_5, we estimated Equation 1 using the PROC MIXED procedure in SAS. This procedure allows for repeated measures within consumers, which was a characteristic of our data, given that participants answered similar questions across categories. We omitted the data from the milk category because of a lack of variance in the dependent variable (93% of consumers "always" or "usually" check expiration dates in this category; see Table 4). We provide the results in Table 7.

We find support for H_1; the greater the risks associated with a product, the more frequently consumers check expiration dates. However, this finding holds true only for PQR in all five categories but not for PR. Therefore, PQR, or the perceived risks associated with the quality of a perishable that is approaching its expiration date and the resultant health risks, are the most salient types of risks and are positively correlated with the frequency with which consumers check expiration dates. However, a higher level of PR is not associated with a greater frequency of checking expiration dates. This finding suggests that marketers should encourage consumers to check expiration dates in categories in which PQR is low and in which consumers therefore do not frequently check expiration dates, thus enabling consumers to make more informed decisions.

We also find strong support for H_2.[5] In all five categories, we find that consumers with greater category experience, as indicated by their household consumption rate, are more likely to check expiration dates. We also find that when PQR perceptions are high, the impact of the household consumption rate on the frequency of checking expiration dates is minimized, in support of H_3. However, the same cannot be said for PR in terms of its support for H_3.

We do not find convincing evidence to support H_4 or H_5; thus, stopping the aging process does not appear to affect the frequency with which consumers check expiration dates. This might be because the act of stopping the aging process is usually situational, whereas the habit of checking expiration dates is an act that spans multiple shopping trips. In addition, the decision to stop the aging process may depend on the consumer's knowledge of the number of days before the product expires, something that is obviously unknown prior to the consumer's checking the expiration date.

Finally, when we consider the demographic variables, we find that older consumers are more likely to check the expiration dates of chicken, carrots, and beef, whereas consumers who do not work full time are more likely to check lettuce and carrots. We could generalize from these findings that consumers with more free time are more likely to check expiration dates, and therefore marketers should focus on consumers with less free time (e.g., younger consumers, those working full time) to ensure that they are aware of expiration dates and are making informed decisions. However, because of the lack of strong consistency in the findings across the five categories, more research is necessary before we can make conclusions of this nature.

To test H_6–H_{13}, we estimated Equation 2 (WTP), again using the PROC MIXED procedure in SAS, and we present the results in Table 8. The results support H_6 in all six categories. Furthermore, we note that WTP decreases linearly for produce and dairy and exponentially for beef and chicken as the number of days left before the product's expiration decreases.[6] In Figure 1, we graph the decline in WTP for all six categories as the products go from seven

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[4] We thank an anonymous reviewer for this suggestion.

[5] We find additional support for this hypothesis through an observation study and personal interviews with consumers, which revealed that those who shop infrequently in a category rarely, if ever, check expiration dates, and many do not even know that expiration dates exist in those categories.

[6] These functional forms were supported in other similar studies that we conducted for this research, which are available on request.

TABLE 5
Factor Loadings

	Lettuce		Milk		Chicken		Carrots		Yogurt		Beef	
Risk Variable	**Factor 1 (PQR)**	**Factor 2 (PR)**	**Factor 1 (PQR)**	**Factor 2 (PR)**	**Factor 1 (PQR)**	**Factor 2 (PR)**	**Factor 1 (PQR)**	**Factor 2 (PR)**	**Factor 1 (PQR)**	**Factor 2 (PR)**	**Factor 1 (PQR)**	**Factor 2 (PR)**
Functional	884	082	864	− 014	833	084	822	067	865	042	863	083
Performance	877	160	837	015	747	159	773	007	836	089	745	254
Physical	472	261	468	205	648	− 029	513	329	649	159	681	− 042
Psychological	− 070	791	− 064	806	− 056	817	009	737	− 062	785	− 047	820
Social	089	744	065	751	088	799	089	778	128	794	113	794
Financial	299	486	290	504	304	432	136	616	301	551	303	416
Cronbach's alpha	70	72	70	71	73	71	74	75	81	74	77	72
Percentage variation explained	317	308	323	282	330	285	291	310	360	294	345	288

TABLE 6
Summary Statistics of Variables in Equations 1 and 2

A: Descriptive Statistics

	Lettuce	Milk	Chicken	Carrots	Yogurt	Beef
FreqCheck[a]	2 81 (1 80)	4 73 (75)	4 01 (1 48)	2 33 (1 69)	3 84 (1 57)	3 81 (1 63)
WTP (7 days)[a]	2 15 (63)	2 14 (82)	2 58 (73)	1 39 (53)	51 (19)	2 33 (83)
WTP (4 days)[a]	1 63 (70)	1 46 (99)	1 65 (92)	1 00 (60)	42 (22)	1 54 (82)
WTP (1 day)[a]	1 08 (79)	71 (78)	1 38 (93)	70 (56)	26 (22)	1 20 (90)
PQR[a]	9 51 (2 02)	10 39 (2 02)	11 10 (2 17)	8 28 (2 11)	10 71 (2 47)	11 52 (2 17)
PR[a]	9 60 (2 20)	8 50 (2 01)	8 56 (2 05)	8 90 (2 16)	8 76 (2 12)	8 84 (2 09)
HHConsume[a]	1 80 (1 42)	3 05 (1 12)	2 47 (1 14)	1 14 (1 15)	1 57 (1 42)	1 66 (1 32)
Stop[b]	27%	11%	34%	33%	13%	31%
Sex[b]	25%[c]	—	—	—	—	—
Age[b]	50%[c]	—	—	—	—	—
Income[b]	63%[c]	—	—	—	—	—
FullTime[b]	57%[c]	—	—	—	—	—
HHSize[a]	2 67 (1 33)[c]	—	—	—	—	—

B: Correlation Matrix (Pooled Across Categories)

	PQR	PR	HH Consume	HHCon × PQR	HHCon × PR	Stop	Stop × PQR	Stop × PR	Sex	Age	Income	FullTime	HHSize
PQR	1												
PR	19	1											
HHCon	01	−01	1										
HHCon × PQR	29	24	16	1									
HHCon × PR	25	28	16	19	1								
Stop	01	−01	−01	01	−01	1							
Stop × PQR	37	31	01	24	20	24	1						
Stop × PR	33	33	−01	21	20	23	18	1					
Sex	22	17	−01	16	11	−01	10	07	1				
Age	25	26	05	17	18	−01	12	13	09	1			
Income	23	21	04	17	16	−02	10	08	19	33	1		
FullTime	24	29	02	18	20	−01	13	15	31	30	31	1	
HHSize	22	21	04	17	14	−01	10	08	16	31	26	17	1

[a] Mean with standard deviation is in parentheses

[b] Percentage of respondents who planned to stop the aging process of the product on arriving home, they were male, were older than age 45, had a yearly income greater than $50,000, and worked full time

[c] Because respondents answered questions across all six categories, these figures do not differ across products

TABLE 7
Results for the Frequency of Checking Expiration Dates

Variable (Hypothesis)	Expected Sign	Lettuce	Chicken	Carrots	Yogurt	Beef
Intercept		72** (25)[a]	3 92** (75)	1 21 (79)	2 23** (72)	3 35** (54)
PQR (H_1)	+	24** (07)	21** (09)	19** (04)	17** (04)	12* (07)
PR (H_1)	+	– 06 (06)	02 (13)	– 05 (07)	– 10 (07)	– 04 (10)
HHConsume (H_2)	+	29** (09)	15** (04)	35** (14)	18* (09)	39** (09)
HHConsume × PQR (H_3)	–	– 03** (01)	– 04* (02)	– 02 (03)	– 04** (01)	– 04* (02)
HHConsume × PR (H_3)	–	– 01 (01)	– 04 (04)	03 (02)	04 (03)	– 01 (03)
Stop (H_4)	–	– 34 (45)	– 39** (11)	13 (10)	– 33 (23)	– 19* (11)
Stop × PQR (H_5)	–	01 (01)	– 05 (07)	– 01 (11)	– 08 (24)	– 01 (07)
Stop × PR (H_5)	–	– 03 (02)	09 (09)	– 02 (10)	11 (29)	07* (03)
Sex		– 12 (21)	– 13 (21)	– 39* (21)	– 19 (21)	– 13 (21)
Age		30 (20)	55** (20)	43** (19)	13 (19)	65** (19)
Income		25 (22)	– 07 (19)	21 (19)	12 (19)	– 13 (19)
Full time		– 32* (18)	– 07 (18)	– 36* (18)	12 (18)	11 (18)
Household size		18 (21)	– 04 (07)	– 12 (08)	05 (07)	– 10 (07)

N = 1350
R^2 Main effects model only = 28
R^2 Full model = 30
F-statistic Full model = 8 05

*p < 05
**p < 01
[a] Numbers in parentheses are standard errors

days to one day before their expiration dates, holding all other variables constant The way that WTP decreases throughout the course of the product's shelf life provides information about consumers' perceptions of how product quality deteriorates over time and the likelihood of the product spoiling at various points In turn, this information provides insights into how discounts can help retailers sell products as they approach their expiration dates

The different functional forms for chicken and beef suggest that a deeper discount is necessary earlier in their shelf lives to encourage a purchase In the stores of the managers we interviewed, chicken and beef are the only perishable products discounted when they approach their expiration dates This trend may explain the different functional forms for these categories, namely, consumers become conditioned to expect a discount when discounting is already practiced In addition, chicken and beef are statistically the most risky of the six categories in terms of PQR[7] Therefore, another possible explanation for the exponential relationship between WTP and days before expiration for beef

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[7] We base this finding on an analysis of variance that tests for statistical differences in PQR and PR across the six product categories The results are available from the authors

TABLE 8
Results for WTP for a Perishable

	Expected Sign	Lettuce	Milk	Chicken[b]	Carrots	Yogurt	Beef[b]
Intercept		1 19*	1 83*	2 03*	74*	25**	2 14**
		(69)[a]	(84)	(98)	(42)	(09)	(72)
Days[b] (H_6)	+	11**	04**	0007**	03**	02*	0004**
		(05)	(01)	(0001)	(01)	(01)	(0001)
PQR (H_7)	–	– 03**	– 02**	– 16**	– 06**	– 02	– 10*
		(01)	(007)	(05)	(02)	(04)	(05)
PR (H_7)	–	– 04	– 01**	– 02	– 03	– 02	– 03
		(03)	(005)	(05)	(02)	(03)	(04)
HHConsume (H_8)	+	02	05	02	03	01**	02*
		(03)	(04)	(04)	(04)	(003)	(01)
HHConsume × days (H_9)	+	01**	01**	0001	03**	03*	0001*
		(003)	(004)	(0001)	(01)	(01)	(0001)
HHConsume × PQR (H_{10})	+	001	002*	004**	002*	002*	004*
		(001)	(001)	(001)	(001)	(001)	(002)
HHConsume × PR (H_{10})	+	002	001	0001	003	002	002*
		(003)	(001)	(0003)	(004)	(003)	(001)
Stop (H_{11})	+	11	08	18	13	06	37**
		(13)	(15)	(11)	(10)	(20)	(11)
Stop × days (H_{12})	+	03**	06	0002*	03**	02*	0002*
		(01)	(08)	(0001)	(01)	(01)	(0001)
Stop × PQR (H_{13})	+	02	01**	03**	03**	02*	04**
		(02)	(003)	(01)	(01)	(01)	(01)
Stop × PR (H_{13})	+	03	02	01	01	03	02*
		(03)	(03)	(02)	(01)	(02)	(01)
Sex		– 13	– 15	– 04	– 18	– 11	07
		(21)	(22)	(18)	(16)	(21)	(09)
Age		07**	02*	25**	37	06	28*
		(03)	(01)	(06)	(25)	(19)	(15)
Income		03	– 09	10	26	11	– 20
		(02)	(19)	(13)	(19)	(09)	(14)
Full time		02	04	– 08	– 38*	13	– 21
		(08)	(18)	(06)	(20)	(11)	(15)
Household size		03**	04	07**	11*	– 04	15*
		(01)	(07)	(02)	(05)	(07)	(07)

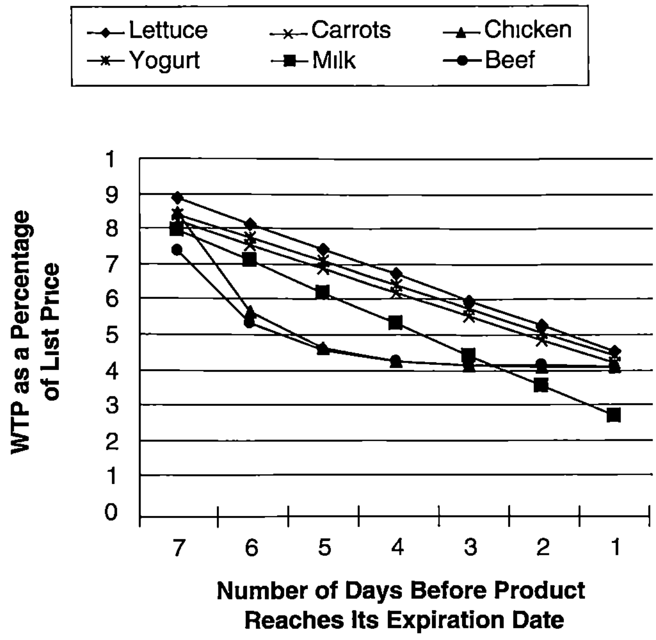
N = 1620
R^2 Main effects model only = 27
R^2 Full model = 36
F-statistic Full model = 8 43

*p < 05
**p < 01
[a] Numbers in parentheses are standard errors
[b] The best-fitting model for chicken and beef operationalizes Days as e(days)

and chicken is that products with high PQR require a multiplicative rather than additive discount to entice a purchase However, more research on this topic is necessary to make such a conclusion decisively

On the basis of the trends in Figure 1, we also note that WTP (as a percentage of the list price) for products with one day left before expiration is the lowest for milk, perhaps because milk is the only product for which the aging

FIGURE 1
WTP as a Percentage of List Price Throughout the Course of a Perishable's Shelf Life



process is difficult to stop (e.g., milk cannot be cooked, except perhaps in a recipe, or frozen). Therefore, the only means of stopping the aging process is by consuming the gallon of milk immediately, a task that takes more than a day for an average household. Therefore, with only one day before expiration, milk's value should be low, as is reflected by the low WTP.

As with H_1, we find support for H_7 with respect to PQR (in all categories but yogurt) but not PR. As consumers' PQR perceptions increase, their WTP for the product decreases. However, this relationship does not hold for risks related to social and financial forces. It is not surprising that PR is not significant, because the products we study are not "status" goods, nor do they require a substantial financial investment. Therefore, for products for which PQR is high, such as beef and chicken, managers should consider greater discounts to compensate for the greater risks associated with these products if they want to sell aging inventory. Other products with high PQR that we do not study herein might include fish or lunch meats. Alternatively, discounting may not be as crucial for perishables for which PQR is lower.

Next, there is no consistent evidence that consumers with higher household consumption rates are willing to pay more for a fresh product, regardless of the number of days remaining before the product reaches its expiration date (H_8). However, we find support for H_9 because as the product approaches its expiration date, WTP decreases at a faster rate for households with lower consumption rates in every category but chicken. In all categories except lettuce, the negative effect of PQR on WTP is dampened for households with higher consumption rates, in support of H_{10} for PQR. However, the same does not hold true for PR. Thus, consumers with higher consumption rates are willing to pay more for a product as it approaches its expiration date than are those with lower household consumption rates. This trend presents an opportunity for managers to target discounts at households with lower consumption rates, and therefore WTP, to sell perishables nearing their expiration dates.

We also find that though stopping the aging process does not affect overall WTP for a fresh perishable, regardless of the number of days remaining before expiration (H_{11}), consumers who plan to stop the aging process are willing to pay more for a perishable as it approaches its expiration date than are those who do not plan to do so (H_{12}). The results strongly support H_{12} in all categories except milk, whose aging process, as we noted previously, largely cannot be stopped. In all categories except lettuce, the negative impact of PQR on WTP is moderated for consumers who plan to stop the aging process, in support of H_{13} for PQR. However, again, the same does not hold true for PR. According to these findings, managers should encourage consumers to stop the aging process of a perishable immediately, especially in categories with high PQR. Some encouragements might include communicating the importance of freezing a product (at the point of purchase or otherwise), providing recipe ideas for the appropriate quantity of the perishable as it is packaged and sold, and selling smaller packages of perishables so that the entire product may be consumed or used in a recipe on the day it is purchased.

Finally, from the demographic variables, we find supporting evidence that older consumers and larger households are willing to pay more for perishables, if all else is equal. For example, it is not surprising that larger households have a higher WTP if we assume that they are able to consume the same amount of perishable goods more quickly than are smaller households. In turn, their risk of not being able to consume the product before it expires is lower, and their value of and WTP for the perishable is higher.

Conclusions and Further Research

We investigate consumers' behavior in six important grocery store perishable categories with printed expiration dates: yogurt, milk, precut lettuce, precut carrots, beef, and chicken. We focus on three main aspects of decision making in these categories: (1) the frequency with which consumers check expiration dates, (2) their WTP for a perishable product throughout the course of its shelf life, and (3) the perceived risks associated with perishables as they approach their expiration dates. We develop a set of hypotheses that predict the relationship among these three aspects of behavior in perishable categories and the variables that moderate them, and we test the hypotheses using a survey study. We present a summary of our results in Table 9.

When investigating the frequency with which consumers check expiration dates, we find that increases in PQR—a factor that captures functional, performance, and

TABLE 9
Main Findings and Implication

Behavior	Main Findings	Implications
Frequency of checking expiration dates	As PQR decreases, consumers are less likely to check expiration dates	Because lack of awareness of expiration dates is bad for consumers (they make uninformed decisions) and marketers (who may be blamed by consumers who purchase products close to expiration at full price), marketers must educate consumers whose perceptions of PQR are low, especially for categories in which the majority of consumers tend to have low perceptions of PQR (e g , carrots, lettuce)
	Consumers with greater category experience check expiration dates more frequently	Discounting perishables that are approaching their expiration dates may be most effective when targeted at consumers with greater category experience In addition, marketers must educate inexperienced consumers about expiration dates so that they can make more-informed decisions
WTP for a product throughout the course of its shelf life	WTP decreases throughout the course of the shelf life of a product	Discounting may be a necessary and effective way to entice consumers to purchase a perishable close to its expiration date
	WTP decreases linearly for products with low PQR and exponentially for products with high PQR	A deeper discount may be necessary to sell a perishable with a high PQR (e g , beef, chicken) earlier in the shelf life of the product
	WTP is lower for younger consumers and consumers with lower household consumption rates	Marketers should target younger consumers and consumers who are shopping for households with lower consumption rates with price incentives to persuade them to purchase perishables close to their expiration dates
	The greater the perceptions of PQR, the lower is the WTP However, household consumption and stopping the aging process moderate this effect	Marketers must educate consumers to reduce perceptions of product quality risks and health risks associated with a perishable as it approaches its expiration date, especially for consumers with low household consumption rates or categories for which the aging process typically cannot be stopped (e g , milk)
	WTP is higher in situations in which consumers plan to stop the aging process	Marketers should provide recipes, cooking suggestions, reminders to freeze the product on arriving home, and so forth, to encourage consumers to stop the aging process They may also offer smaller package sizes to serve the same purpose

physical risks—have a positive impact on the frequency with which consumers check expiration dates However, this effect does not hold for the PR factor, which captures psychological, social, and financial risks We also find that consumers with greater category experience, as measured by household consumption rate, check expiration dates more frequently

Discounts may be necessary to sell aging inventory to consumers who are aware of expiration dates, and our findings suggest that such promotions should be targeted at experienced consumers, those with higher perceptions of PQR, and those who shop in categories in which there is a greater tendency to check expiration dates, such as beef and chicken For example, experienced shoppers could be identified by means of scanner data, which reveal those who shop more frequently in a category, and the technology necessary to target these consumers with price promotions is on the horizon As Keenan (2003, p 63) notes, "with new gadgets such as electronic shelves and digital price labels coming down the pike, retailers may eventually be able to change prices in the blink of an eye—and send electronic messages to shoppers' carts for custom-made deals "

However, marketers also must pay special attention to educating consumers who infrequently check expiration dates (e g , inexperienced consumers, consumers with low PQR, younger or full-time employed customers) about the existence and importance of such dates, especially in categories for which PQR is low for most consumers, such as carrots and lettuce This effort would help avoid the potential ill will that is created in cases in which uninformed consumers unintentionally buy a perishable good close to its expiration date only to get it home and place blame on the store when it spoils sooner than they expected In addition, marketers can minimize confusion by educating consumers about the different meanings of expiration dates or by adopting a more uniform classification method to date foods

With respect to WTP, we find support for the hypothesis that WTP decreases throughout the course of the product's shelf life, which suggests the need to educate consumers that product quality, and thus the value of the perishable, does not decline as the product approaches its expiration date. To be credible, this education would need support from third-party sources, such as the Center for Food Safety and Applied Nutrition (Hunter 1994). However, in the meantime, discounting may be an effective way to persuade consumers to purchase a perishable close to its expiration date.

We also find that WTP decreases linearly throughout the shelf life for lettuce, carrots, milk, and yogurt (products with relatively lower PQR) and exponentially for beef and chicken (products with relatively higher PQR). Therefore, a deeper discount earlier in the shelf life may be necessary to sell beef, chicken, and similar perishables. In addition, we find that WTP is lower for households with lower consumption rates, smaller households, and younger consumers. Therefore, discounting perishables that are approaching their expiration date will be most effective when it is targeted at these segments.

Finally, we find that WTP is greater when consumers plan to stop the aging process and that this effect is stronger the closer the product is to its expiration date. On the basis of this finding, we suggest that managers (1) remind consumers at the point of purchase of the importance of freezing a product, (2) provide recipe ideas for the appropriate quantity of the perishable as it is sold and locate common combinations of food items together (e.g., strawberries next to angel food cake) to encourage ideas for immediate consumption, or (3) sell smaller package sizes so the perishable can be consumed or used in a recipe on the day it is purchased.

In conclusion, we recognize that the decision of how to market grocery store perishables, including whether and how much to discount perishables as they approach their expiration date, requires a more in-depth analysis of the profit margins of each product and of the effects of discounting on store traffic, category volume, and cross-category effects. However, our results provide grocery store managers with some insights into the impact of discounting perishables on consumers' behavior and perceptions. Furthermore, we show how perceived risk, a widely studied topic that has not been applied to perishable goods, can be used to understand and generalize behavior more effectively in these important categories. We hope that this research encourages others to examine consumer behavior in these profitable and important categories in an effort to aid managers in determining their product strategies.

Further research attempts might investigate the PQR dimension to determine whether our results for this important risk dimension are generalizable to other perishable categories. It also might be beneficial to conduct a field experiment to examine the impact of discounting perishables on purchase behavior. Such an effort would facilitate a more comprehensive analysis of consumers' WTP for a perishable throughout the course of its shelf life and may answer questions such as when and by how much the product should be discounted. It would also be worthwhile to examine how the WTP function changes when a fresher, more expensive batch of goods is shelved alongside an older, discounted set of products.

Finally, a more in-depth study of the management of perishables and its effect on store image would be of interest. Our interviews with managers revealed that many stores discount beef and chicken but are reluctant to discount dairy or produce for fear that such actions will tarnish the store's image. However, our findings reveal that consumers do not perceive any differences among the products examined in our study in terms of the effect that discounting them has on store image (see Table 4). Furthermore, some products that managers traditionally do not discount (e.g., carrots, lettuce, yogurt) are less likely to affect store image negatively when discounted than are those that managers already discount (e.g., chicken, beef). Therefore, for each product category, managers should weigh the trade-offs between the potential benefits of discounting to sell inventory and its potential negative effects on store image. As recent research suggests, organizations can also publicize socially responsible programs to create a competitive advantage in the marketplace (Lichtenstein, Drumwright, and Braig 2004). By presenting their discounting as an alternative to throwing away the product, stores can promote a socially responsible image that may provide both short- and long-term benefits for the store.

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Richard G. Netemeyer, James G. Maxham III, & Chris Pullig

Conflicts in the Work–Family Interface: Links to Job Stress, Customer Service Employee Performance, and Customer Purchase Intent

Because customer service employees often represent the sole contact a customer has with a firm, it is important to examine job-related factors that affect customer service employee performance and customer evaluations In two diverse customer settings, the authors capture matched responses from service employees, supervisors, and customers The authors use the data to examine the potential chain of effects from customer service employee work–family conflict and family–work conflict, to job stress and job performance, to customer purchase intent (CPI) The results show direct (and indirect) effects of work–family conflict and family–work conflict on service employee customer-directed extra-role performance (CDERP) The results also show direct effects of job stress on service employee in-role performance (IRP) and CDERP and on CPI Furthermore, the findings show that job stress has a more pronounced effect on IRP than on CDERP and that CDERP has a greater effect on CPI than does IRP The authors conclude with a discussion of managerial and theoretical implications

In recent years, the changing workforce (e g , more dual career couples) and the nature of work itself (e g , an increase in the number of service sector jobs) have given rise to conflicts in the work–family interface that may affect the work performance of employees and organizations (De Jonge and Dormann 2003) The conflicts may have their most pronounced effects in the stressful environment of customer service jobs Customer service employees may take their jobs home with them, creating work–family conflicts (WFCs) that lead to additional stress at work, thus affecting their performance and customers' evaluations Indeed, recent reports suggest that conflicts in the work–family interface lead to job stress, which in turn seriously impairs service employee performance (Molpus 2003, National Institute for Occupational Safety and Health 2002) Two stressors in this interface are WFC and family–work conflict (FWC), the former is a form of interrole conflict in which the demands created by the job interfere with the performance of family-related responsibilities, and the latter is a form of interrole conflict in which the demands created by the family interfere with the performance of work-related responsibilities (Netemeyer, Boles, and McMurrian 1996) As with most WFC and FWC conceptualizations, our concepts view family as a larger, nonwork entity that includes responsibilities toward spouses, children, nonmarried partners, and home life in general (Adams, King, and King 1996, Frone 2000, Frone, Russell, and Cooper 1992)

To date, there is primarily anecdotal evidence of the effects of WFC and FWC on employee performance and customer outcomes For example, *USA Today* reports that 32% of employees indicated that balancing work and family demands was their leading job-related concern (Armour 2002) Likewise, a *Financial Times* article notes that despite the best managerial support, the home demands of customer service employees may permeate their work lives and negatively affect their job performance (Furnham 2002) Given that customer service employees are highly stressed and struggle to balance the demands of several parties, it is important to examine the potential chain of effects from WFC and FWC, to job stress, to performance, and, ultimately, to customer purchase intent (CPI) Furthermore, because service employees often need to go beyond their in-role performance (IRP) to help customers, research must explore how the work–family interface affects customer-directed extra-role performance (CDERP) and customer evaluations

Our research examines three questions pertaining to the potential chain of effects from WFC and FWC to CPI First, how do WFC and FWC affect customer service employee performances? Are their effects mediated by job stress, or are they direct? Second, what is the effect of job stress on customer purchase intent? Third, what are the relative

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Richard G Netemeyer is Ralph A Beeton Professor of Free Enterprise (e-mail rgn3p@virginia edu), and James G Maxham III is Assistant Professor of Commerce (e-mail maxham@virginia edu), McIntire School of Commerce, University of Virginia Chris Pullig is Assistant Professor of Marketing, Hankamer School of Business, Baylor University (e-mail Chris_Pullig@baylor edu) This research was funded in part by the Bernard A Morin Fund for Marketing Excellence at the McIntire School of Commerce The authors thank Tom Bateman and members of the marketing faculty at the Leeds School of Business at the University of Colorado for their helpful comments on previous drafts of this article

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effects of WFC, FWC, and job stress on service employee performances? We collect multisource data in two settings (one business-to-consumer and one business-to-business) to address these questions

Overview and Hypotheses

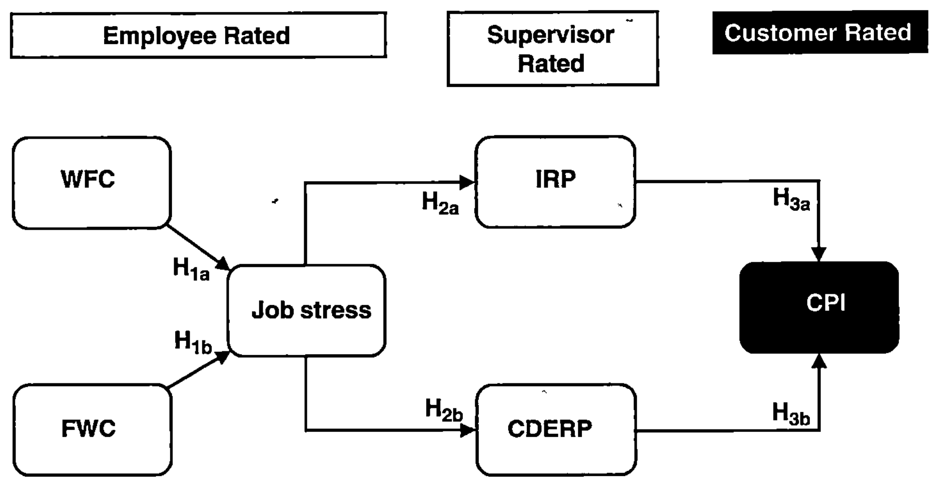
Overview of Models

Figure 1 presents two models of the relationships among WFC, FWC, job stress, service employee IRP, service employee CDERP, and CPI Although many frameworks have been proposed for studying the work–family interface, our models are derived from three mostly complementary theoretical perspectives (1) interrole conflict theory (Kahn and Byosiere 1992), (2) identity theory (Thoits 1991), and (3) conservation of resources (COR)/resource drain theory (Hobfoll 2002) The three theories share the common premise that WFC, FWC, and job stress compete for or tax the employee resources of time, cognitive effort, and emotional and psychological energy

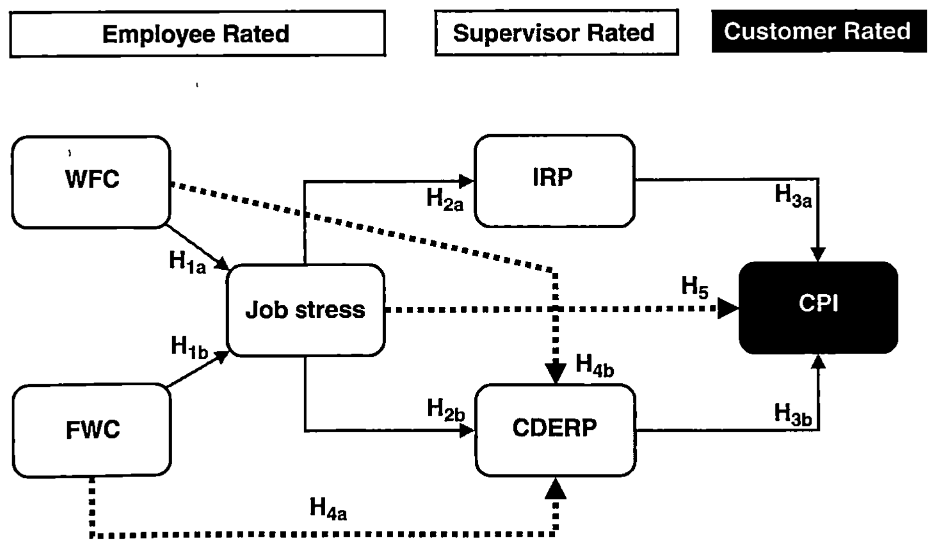
The mediated model in Figure 1, Panel A, posits that the effects of WFC and FWC on CDERP are mediated by job

FIGURE 1
Mediated and Incremental Effects Models of WFC and FWC

A: Mediated Model



B: Incremental Effects Model



Notes Dashed lines represent incremental effects stress, and the effect of job stress on CPI is mediated by the two performance constructs (i e , IRP and CDERP) This model is consistent with the more traditional approaches of how job stressors (i e , WFC and FWC) and job stress affect performance and customer outcomes (Beehr 2000, Kahn and Byosiere 1992), that is, job stress is an affective mediator of the effects of WFC and FWC on performance, and performance is a behavioral mediator of the effect of job stress on CPI The incremental effects model in Figure 1, Panel B, posits that FWC and WFC directly affect CDERP beyond their effects on job stress, and job stress directly affects CPI beyond the effects of the performance variables We compare the mediated and incremental effects models with the premise that the incremental direct effects of WFC and FWC on CDERP and of job stress on CPI are tenable

Mediated Model

Job stress and the effects of WFC and FWC We define job stress as nervousness/anxiety associated with the job, affecting an employee's emotional and/or physical health (Cox, Griffiths, and Rial-Gonzalez 2000) Interrole conflict theory contends that WFC should affect job stress because of the competing demands that WFC places on time, cognitive, and emotional resources that are necessary to fulfill both work and family roles (Frone, Russell, and Cooper 1992) Similarly, identity theory contends that people have multiple role identities and devote resources to maintain identities that are salient to them People experience job stress when they encounter impediments to these identities Thus, WFC represents an impediment to successfully meeting the family role, which in turn increases job stress (Thoits 1995) In addition, the relationship between WFC and job stress is consistent with the COR/resource drain approach, which specifies that energy, cognitive effort, and so forth, are finite resources that people apply to both work and family Thus, WFC leads to job stress because resources are lost in the process of juggling both work and family, creating elevated levels of stress at work (Hobfoll 2002)

Interrole conflict theory suggests that job stress is experienced if a person is struggling to meet the demands of a role because of interferences from the family role As such, those who perceive high FWC may be overwhelmed by their home duties and experience job stress (Frone, Russell, and Cooper 1992) Consistent with identity theory and the COR/resource drain approach, FWC may represent an impediment to completing work duties, because the family role is competing for resources that are necessary to fulfill the work role This undermines a person's work–role identity, increasing job stress Scholars suggest that such an effect represents a spillover in which the demands of one role exacerbate the stress in another role (Edwards and Rothbard 2000)

H_1 Both (a) WFC and (b) FWC positively affect (produce) job stress

Service employees and job performance Before offering rationale for the effects of job stress on customer service employee performances, we provide an overview of service employees' customer-linking behaviors, and we distinguish between IRP and CDERP At least three customer-linking behaviors of service employees have been identified (Bettencourt and Brown 2003) First, service employees can enhance their firm's image by advocating the firm's products and services to third parties (i e , customers) Second, service employees are in a position to unveil customer wants, needs, and expectations that can be communicated to the firm to serve customers better Third, customer evaluations are contingent on the service employees with whom the customer interacts Such high-quality interaction enhances a firm's customer evaluations These customer-linking behaviors can help retain current customers and attract new customers through favorable word of mouth from current customers Embedded in these behaviors are IRP and CDERP

Our conceptualization of IRP is consistent with three works First, Motowidlo and Van Scotter (1994) suggest that IRP reflects officially required performances that serve the goals of or support the technical core of the firm Second, Singh, Verbeke, and Rhoads (1996) operationalize IRP in terms of performance with regard to knowledge of the firm's products, knowledge of customer needs, management of time, company resources, and expenses, as well as the number (quantity) of customers served Third, Singh (2000) views IRP in terms of productivity and quality Productivity reflects quantifiable output in terms of customer contacts/calls and backroom functions (e g , paperwork), and quality reflects formally mandated behaviors during the employee–customer interface Consistent with these views, we define (and operationalize) IRP as (1) the quality of performance with regard to the employee's knowledge of the company, competitor products, and customers, (2) the quality of performance with regard to the accurate management of records, time, and expenses, and (3) the quantity of work achieved

We focus on the most relevant type of extra-role performance in the customer service setting, CDERP Borman and Motowidlo (1993) suggest that favorably representing the organization to customers is part of "contextual" customer performance that goes beyond an employee's in-role job requirements Bettencourt, Gwinner, and Meuter (2001) and Bettencourt and Brown (1997) suggest that CDERP reflects employees' extra efforts to take initiatives that improve service when they communicate with customers, as well as conscientious extra efforts to respond to customer concerns Consistent with these views, we define CDERP as the degree to which the service employee "goes the extra mile" in serving customers during the employee–customer interface

Effects of job stress on performance It is widely accepted that the customer service job is stressful (De Jonge and Dormann 2003), and it follows that job stress can hinder an employee's IRP First, customer service employees typically believe that they lack control over their jobs and that they have the onerous task of satisfying conflicting demands of customers and managers To magnify these issues, technology improvements have enabled service employees to handle more customer inquiries per hour, and employees rarely know the pace or nature of their work ahead of time (Schneider and Bowen 1995, Slepicka 2000)

These factors contribute to job stress, detracting from the time that is necessary for such IRP tasks as record keeping and staying abreast of product knowledge. Second, job stress disrupts employees' ability to perform prescribed tasks, because it also strips them of the energy resources that are necessary to perform (Hobfoll 2002). Thus, we expect job stress to negatively affect IRP.

We also expect job stress to affect CDERP. Because IRP requires formal reporting that is expected by management, some portion of a service employee's resources is likely devoted to IRP, leaving fewer resources to engage in CDERP. This notion is consistent with the COR/resource drain view, and job stress theorists note that an indication of elevated job stress is when employees stop engaging in CDERPs (Jex 1998). In addition, frontline employees may "disengage" from performing CDERPs, because job stress drains the types of emotional and cognitive resources (patience, empathy) that are necessary to offer stirring performances during the employee–customer interface (De Jonge and Dormann 2003; Kahn 1990).

H_2: Job stress negatively affects (a) IRP and (b) CDERP.

Effects of performance on CPI. Perhaps no other customer outcome is a better indicator of loyalty than the intent to purchase again from a firm (Oliver 1997). Service employee performance may play a key role in influencing such intent. For example, service employee role-prescribed behavior has been found to affect customer satisfaction and loyalty (Bettencourt and Brown 1997). Furthermore, CDERPs, as rated by customers, have been found to positively affect customer perceptions of justice in a complaint-handling setting (Maxham and Netemeyer 2003). Conceptual writings also suggest that CDERP "delights" customers and enhances their intent to repurchase (Schneider and Bowen 1999).

H_3: Both (a) IRP and (b) CDERP positively affect CPI.

Incremental Effects Model

FWC and WFC effects on CDERP. Although we expect that job stress is the primary predictor of IRP and CDERP, we also expect that FWC and WFC explain incremental variance in CDERP beyond that which is explained by job stress. Boundary spanners, such as customer service employees, must balance the demands of groups internal (supervisor, customers) and external (family) to the job. Compartmentalizing the cognitive and emotional resources that are necessary to fulfill the demands is difficult, negatively affecting certain aspects of performance, namely, CDERP. Furthermore, effective CDERP requires employees to engage customers, patiently listen to their concerns, and quickly develop suitable resolutions. Employees might not be able to perform these critical work roles effectively when they are expending considerable cognitive and emotional resources to resolve conflicts with their lives outside of their jobs (Kahn 1990). As such, employees may disengage from performing, and we posit that FWC negatively (and incrementally) affects CDERP.

We also contend that WFC has an incremental direct effect on CDERP. Edwards and Rothbard (2000) suggest that conflict in one domain reduces the personal capability to meet demands in the other domain, thereby inhibiting role performance in the other domain. They suggest that such an effect is direct, as well as indirect, through a mediating mechanism such as mental/physical health (i.e., job stress). Identity theory further contends that competing salient roles (family and work) potentially have a spillover effect, implying that work that interferes with family may affect CDERP. Finally, in his conceptualization of being personally disengaged from work, Kahn (1990) suggests that conflict in the work–family interface directly affects performance, particularly in service-related jobs. He suggests that employees may withdraw from a work role because resources that are necessary for that role (i.e., patience, understanding, and cognitive effort endemic to CDERP) are the same resources that are devoted to an outside role (family).

H_4: Beyond the effect of job stress on CDERP, (a) FWC and (b) WFC negatively affect CDERP.

Effect of job stress on CPI. We posit that beyond the effects of employee performances, job stress incrementally affects CPI. Our rationale is as follows: First, although employees are believed to self-regulate by trying to conserve resources that are necessary to perform their jobs, the resources are quickly depleted when the job situation is stressful (Muraven, Tice, and Baumeister 1998). In customer service settings, there is a heightened potential for contentiousness between service employees and customers, as customers impose a variety of cognitive, emotional, and behavioral demands on service employees that may lower overall customer evaluations (De Jonge and Dormann 2003).

Second, customers are likely to detect the manifestations of job stress in the forms of poor decision making, lack of self-control, carelessness, or inhospitable looks. In effect, this lowers the ability to generate CPI, because service employees who experience job stress may not provide quality interactions with customers. Such a process concurs with Kahn's (1990) view of disengagement in critical moments of the work role. Specifically, job stress may directly affect CPI by inhibiting the service employee from offering a stirring role performance when interacting with customers. Customers may sense this and give low CPI ratings. Finally, there are anecdotal writings that suggest that when employees experience less job stress, customers rate the service they receive more favorably, creating positive customer evaluations (Furnham 2002; Schneider and Bowen 1999).

H_5: Beyond the positive effects of the performance constructs on CPI, job stress has an incremental negative effect on CPI.

Relative Effects of WFC, FWC, Job Stress, and Performance

WFC versus FWC and their effects on CDERP. It is important to understand whether FWC or WFC has a more detrimental effect on CDERP. Conventional wisdom and interrole conflict theory suggest that FWC should have a greater effect That is, FWC reflects the degree to which the family role interferes with performing work-related tasks, whereas WFC reflects the degree to which the job role interferes with performing family-related tasks Interrole conflict theory further suggests that negative behavioral outcomes are more likely experienced in the domain to which the source of the conflict is directed (i e , family interfering with work) (Netemeyer, Boles, and McMurrian 1996) Finally, the employee resources that are necessary to fulfill the family role (patience, understanding, and empathy) are the same resources that are endemic to CDERP As the family role depletes the resources, less of the resource is available for CDERP Thus, we expect that FWC has a stronger effect on CDERP than does WFC

H_6 The effect of FWC on CDERP is stronger than the effect of WFC on CDERP

Job stress and its effect on IRP versus CDERP Does job stress have a stronger effect on IRP or on CDERP? Considering the type of extra-role performance that we examine, we believe that job stress has a stronger effect on IRP Identity theory suggests that the strength of identification with a role dictates the resources that are applied to the role This tenet also holds for a role within a given role (IRP versus CDERP within the overall work role) (Rothbard and Edwards 2003) Specifically, the goals of the firm are at the core of an employee's work-role investment In a customer service context, a firm's goal is to maximize customer loyalty, and employees may allow job stress to affect IRP more than CDERP because they identify more strongly with the CDERP aspect of the work In addition, consistent with the attraction–selection–attrition framework (Schneider, Goldstein, and Smith 1995) and Bitner, Booms, and Mohr's (1994) work, boundary spanners are attracted to their positions because they possess the characteristics and the desire to provide good service Finally, in our samples, the service employees went through extensive selection, training, and socialization processes These processes emphasized the goal of customer retention by "going the extra mile" and "taking ownership" of a customer's problem On the basis of this rationale, we expect that IRP suffers more at the hands of job stress than does CDERP

H_7 Job stress has a stronger effect on IRP than on CDERP

CDERP versus IRP and their effects on CDERP We posit that CDERP has a stronger effect on CPI than on IRP for three reasons First, customers are more likely to witness extra-role behaviors Given that many IRPs are not seen or do not resonate with customers unless they are exceptionally good or poor, it seems reasonable that the effect of IRP is not as strong as that of CDERP Furthermore, because extra-role behaviors go "beyond the call of duty," these behaviors are more likely to strike a chord with customers and resonate with them over time This notion is consistent with the writings of Bitner, Booms, and Tetreault (1990) In their analysis of critical customer service incidents, they report that "extraordinary" service employee behaviors, such as courtesy and thoughtfulness, translated into customers' experiencing high levels of satisfaction and remembering the service encounter

Second, customers tend to recall encounters that are vivid or distinct, such as those involved in our customer complaint settings (Price, Arnould, and Tierney 1995) Furthermore, given that CDERPs are discretionary, customers may view the behaviors as internal to the customer service employee with whom they dealt Similar to the cognitive processes that underlie managers' performance ratings of employees, customers may attribute CDERPs as stable and internal to the employee (i e , "this person is giving great service because he or she wants to, not because he or she has to") Such CDERPs are likely to be retained in memory and recalled in deriving final evaluations (i e , CPI) (e g , MacKenzie, Podsakoff, and Fetter 1993) Thus, CDERP should have a greater effect on CPI than does IRP

Finally, service employees are hired to handle customer issues, and in managers' communication to employees (as in our samples that follow), they reiterate that in-role job duties are primarily tools that may help employees solve customer problems It is also strongly stressed to employees that they must "see the big picture" of the organizational goal of retaining customers by solving customer problems It would seem that CDERP is more instrumental to that goal than is IRP

H_8 CDERP has a stronger effect on CPI than does IRP

Study Methods

Sample 1: Procedures and Measures

Procedures With our first sample, we gathered data from customers, customer service employees, and supervisors of an online electronics retailer (i e , a business-to-consumer setting) Customers initiated contact with the firm by telephoning the customer service center, which routed them to a service employee (The primary responsibility of each employee was to handle customer complaints) The employee logged a "job problem report" into the customer database and then attempted to resolve the complaint All customer queries appeared in a complaint register, which was closely monitored by service employee supervisors After exhausting all efforts to resolve a complaint, customer service employees "closed out" the job problem report in the customer database and noted the event history in the buyer's profile

Customer measures Our data-collection process began with customers A total of 700 surveys were e-mailed to customers after they experienced a customer service interaction Of the 700 e-mailed surveys, 346 were returned, of which 320 had complete responses across all study variables, yielding a 45 7% customer response rate Within the six-month study period, each of the 320 customers dealt exclusively with only one service employee, and in all cases, the complaint that the customers registered was their first ever with the firm

After the customer's most recent service experience with the firm and its employee, customers rated three CPI items on a seven-point scale, ranging from "not likely" to "very likely" Given that customer satisfaction is commonly viewed as an antecedent of CPI, we created a measure of satisfaction based on the complaint/service request we described previously. We used the measure as a control variable to estimate all models that follow. In total, 60% of the sample was male, 69% had been customers for two to four years, 51% reported incomes from $40,000 to $60,000, and 74% held college degrees.

Employee measures. After a customer service inquiry was closed out, an e-mail containing a survey was sent to the service employee who handled the complaint. Surveys were sent to 700 service employees who specifically handled the 700 customer-initiated complaints. Of the surveys sent to customer service employees, 621 usable responses were returned, yielding an 88.7% response rate. In total, 320 surveys were matched to the fully completed customer survey, yielding a 45.7% response rate. That is, 320 service employee surveys were matched to the specific customer survey that represented the customer whom they had served. Thus, all analyses involving Sample 1 use a sample of 320 customer–employee response pairs.

The survey asked employees about their perceptions of the focal constructs (i.e., WFC, FWC, and job stress) over the past six months. We measured WFC and FWC with three items from the scales that Netemeyer, Boles, and McMurrian (1996) developed. We measured job stress with three items from the anxiety–stress scale that House and Rizzo (1972) developed and with one item that we generated. We also gathered two other measures from service employees. Job satisfaction and affective organizational commitment (OC) have been shown to be potential outcomes of WFC, FWC, and job stress and to be potential antecedents and/or outcomes of IRP and CDERP (MacKenzie, Podsakoff, and Ahearne 1998; Podsakoff et al. 2000). We used a three-item measure of job satisfaction and a four-item measure of OC (Mowday, Steers, and Porter 1979), and we used these measures as control variables to estimate all models that follow. All items were rated on a seven-point scale, ranging from "strongly disagree" to "strongly agree." All employees were full time, 53% were female, 82% had been employees for five years or fewer, 81% reported incomes from $40,000 to $70,000, and 67% held college degrees.

Supervisor measures. The 53 supervisors who managed the 320 employees were also sent e-mailed surveys, and all 53 participated. The supervisors managed an average of six service employees and rated their performance for the six-month study period. The supervisor surveys were returned and were matched to the respective employees whom they rated. Given that supervisors rated more than one employee, we created a partially nested design between employees and supervisors. In addition to estimating our structural equation models (see Figure 1), we estimated a set of linear mixed models that control for any random effects of the supervisors' repeated measurements on the parameter estimates that involve the supervisor–employee pairs (H_2–H_3). For both samples, there was no significant across- or within-supervisor rating biases due to evaluating multiple employees within a workgroup.

We measured employees' IRP with three items that we adapted from Singh, Verbeke, and Rhoads's (1996) work; the items were rated on a seven-point scale, ranging from "among the worst in the company" to "among the best in the company." We measured CDERP with four items that we adapted from Bettencourt and Brown's (1997) work; the items were rated on a seven-point scale, ranging from "never" to "as often as possible." We used supervisor-rated measures of employee performance for several reasons. First, employees may overrate their performance (Murphy and Cleveland 1995). Second, evidence suggests that as predictors of a criterion variable other than that rated by employees or supervisors, supervisor-rated measures of employee performance have the stronger predictive validity (Atkins and Wood 2002). Other scholars also suggest that supervisor-rated measures of employee performance are more valid than are employee self-ratings (Scullen, Mount, and Goff 2000). Finally, we used a supervisor-rated measure of employee performance because customers rated the prime dependent variable of interest, CPI. Thus, the links between the performance constructs and CPI are free of same-source bias (Podsakoff et al. 2003). Of the supervisors, 60% were female, 80% had been with the firm for eight years or more, 77% reported incomes from $55,000 to $70,000, and 57% held college degrees (the Appendix shows the measures for the focal constructs of our studies [i.e., CPI, WFC, FWC, job stress, IRP, and CDERP]).[1]

Sample 2: Procedures and Measures

Procedures. Our second sample used 132 customers, service employees, and supervisors of a manufacturer/seller of technology-related equipment for retailers and financial service institutions (i.e., business-to-business setting). Customers initiated a call to the service employee, who personally visited the customer's site and tried to resolve a problem that the customer was having with equipment purchased from the manufacturer. The majority of complaints involved software/hardware malfunctions, and supervisors often accompanied service employees. We used the exact same data-collection procedures as we did for Sample 1.

Customer measures. Surveys were e-mailed to customers after they experienced a customer service interaction. Of the 200 surveys that were sent, 132 were returned with complete responses across the same customer measures that we used in Sample 1 (a 66% customer response rate) The 132 customer respondents dealt specifically and exclusively with one of the 132 service employees over the six-month study period These customers were responsible for the purchasing and day-to-day functioning of the technical equipment used in their firms In total, 67% of the customers were female, and 82% held college degrees

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[1] Three measurement issues are of note. First, we began with 23 employee-rated items. Using confirmatory factor analyses and our own judgment, we trimmed this pool to 17 items (3 WFC, 3 FWC, 4 job stress, 3 job satisfaction, and 4 OC). We began with 9 supervisor- and 6 customer-rated items. Using confirmatory factor analyses, we retained 7 supervisor items and 6 customer items. Second, because we are linking performance measures that span a six-month period to a specific customer's purchase intents, we assume that performance is stable over time. There is some evidence to support this assumption; Viswesvaran, Ones, and Schmidt (1996) report a meta-analytic correlation of .81 for supervisor ratings of employee performance over two time periods. The strength of the correlation is indicative of stable performance over time. Third, although the performance–CPI links are free of same-source bias, WFC, FWC, and job stress items were rated by the same source. We compared the path estimates of a same-source methods factor model to the path estimates from a model without the same-source factor (Williams and Anderson 1994). We found that the path estimates were somewhat attenuated when the same-source factor was present, but the path estimates were not significantly affected.

Employee measures After the customer service inquiries were resolved, a survey was e-mailed to the 200 service employees who specifically handled the 200 customer-initiated complaints Of the surveys sent, 185 responses were returned, yielding a 92 5% employee response rate Of these, 132 surveys were matched to the completed customer survey, yielding a 66% matched response rate Thus, all analyses for Sample 2 use a sample of 132 customer–employee response pairs The employees completed the same measures that we reported in Sample 1 All employees were full time, 67% were female, 82% had been employees for three years or fewer, 72% reported incomes from $50,000 to $70,000, and 87% held college degrees

Supervisor measures The 27 supervisors who managed the 132 employees were also sent e-mailed surveys Each supervisor managed an average of five employees and rated the employees for the six-month study period over the same performance measures that we used in Sample 1 The supervisor surveys were matched to the respective service employee survey In total, 42% of the supervisors were female, 60% had been employees for six years or more, 78% reported incomes from $50,000 to $70,000, and 65% held college degrees [2]

Measurement Checks

Discriminant validity and reliability We examined the psychometric properties of our measures by estimating a 30-item, 9-factor (WFC, FWC, job stress, job satisfaction, OC, IRP, CDERP, CPI, and customer satisfaction) measurement model This model fit the data well for Sample 1 (χ^2 = 882 35, degrees of freedom [d f] = 369, comparative fit index [CFI] = 94, nonnormed fit index [NNFI] = 93, and root mean square error of approximation [RMSEA] = 06) and for Sample 2 (χ^2 = 592 29, d f = 369, CFI = 93, NNFI = 92, and RMSEA = 06) (Hu and Bentler 1995) Tables 1 and 2 show summary statistics, internal consistency estimates, and correlations for Samples 1 and 2, respectively Coefficient alpha estimates of internal consistency ranged from 61 to 95, and average variance estimates (AVE) ranged from 30 to 87 The disattenuated correlations among the constructs (φ estimates) ranged from – 79 (job stress and IRP) to 72 (IRP and CDERP) We examined discriminant validity among the constructs by comparing φ to AVE If the square of the parameter estimate between two constructs (φ^2) is less than the average AVE between the two constructs, discriminant validity is supported (Fornell and Larcker 1981) This criterion was met for all possible pairs of constructs in Tables 1 and 2

Multigroup measurement invariance We also tested whether the measures were invariant across samples by estimating a hierarchy of multigroup measurement invariance models (Steenkamp and Baumgartner 1998) The first model that we estimated was a baseline measurement model of the same pattern of fixed and free parameters This model fit the data well (χ^2 = 1474 64, d f = 738, CFI = 94,

TABLE 1
Summary Statistics, Internal Consistency Estimates, and Correlations Among Constructs: Sample 1 (N = 320)

	Mean	Standard Deviation	α	AVE	1	2	3	4	5	6	7	8	9
Focal Constructs													
1 WFC	5 86	1 17	91	78	1 00								
2 FWC	5 44	82	84	70	69	1 00							
3 Job Stress	5 47	86	89	73	64	41	1 00						
4 IRP	3 83	1 39	94	85	– 36	– 28	– 79	1 00					
5 CDERP	3 01	1 22	95	87	– 69	– 52	– 68	72	1 00				
6 CPI	3 24	1 03	90	75	– 75	– 47	– 76	63	62	1 00			
Control Variables													
7 Job satisfaction	4 69	88	77	60	– 32	– 17	– 52	42	24	54	1 00		
8 OC	4 44	60	63	31	– 29	– 27	– 51	50	27	61	52	1 00	
9 Customer satisfaction	5 48	1 00	83	65	– 51	– 45	– 52	55	61	40	17	19	1 00

Notes Means and standard deviations are based on summated scale averages Correlations are disattenuated estimates from a confirmatory-factor measurement model

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[2] We conducted several sample bias checks For both samples, we compared the demographic characteristics of our employee, supervisor, and customer samples with several other samples that did not participate in our study We found no significant differences between our samples and the other samples across demographics We also assessed potential effects of employee gender, age, and education As predictors or moderators of WFC and FWC, these variables had no effects For Sample 2 (n = 132), we assessed whether marital status and having child dependents affected the results These variables had no effects as either predictors or moderators of WFC and FWC

TABLE 2
Summary Statistics, Internal Consistency Estimates, and Correlations Among Constructs: Sample 2 (N = 132)

	Mean	Standard Deviation	α	AVE	1	2	3	4	5	6	7	8	9
Focal Constructs													
1 WFC	5 81	1 22	94	84	1 00								
2 FWC	5 36	85	80	64	63	1 00							
3 Job Stress	5 55	84	87	66	60	46	1 00						
4 IRP	3 76	1 39	93	83	− 37	− 36	− 76	1 00					
5 CDERP	3 11	1 22	92	82	− 73	− 60	− 65	69	1 00				
6 CPI	3 25	1 05	89	72	− 72	− 50	− 73	66	66	1 00			
Control Variables													
7 Job satisfaction	4 65	90	75	59	− 29	− 22	− 52	38	27	53	1 00		
8 OC	4 50	57	61	30	− 24	− 33	− 43	49	27	66	53	1 00	
9 Customer satisfaction	5 50	1 00	87	71	− 47	− 45	− 50	51	58	40	15	10	1 00

Notes Means and standard deviations are based on summated scale averages Correlations are disattenuated estimates from a confirmatory-factor measurement model

NNFI = 93, and RMSEA = 06) Next, we estimated a model that constrained the factor loadings to be invariant across groups The fit indices for this model were acceptable (χ^2 = 1491 11, d f = 759, CFI = 94, NNFI = 93, and RMSEA = 06), and the difference in fit between this model and the baseline measurement model was not significant (χ^2_{diff} = 16 47, d f $_{diff}$ = 21, $p >$ 10) Thus, the loadings for all measurement items were invariant across samples The third model that we estimated specified invariant factor variances and covariances in addition to invariant factor loadings It had acceptable fit indices (χ^2 = 1510 29, d f = 804, CFI = 94, NNFI = 93, and RMSEA = 06), and the difference in fit between this model and the baseline measurement model was not significant (χ^2_{diff} = 35 65, d f $_{diff}$ = 66, $p >$ 10) Thus, all correlational (covariance) relations among model constructs, as well as construct (factor) variances, were equal across samples Finally, we estimated a fully invariant measurement model (i e , invariant factor loadings, invariant factor variances and covariances, and invariant item error loadings) Although the indices showed adequate fit (χ^2 = 1659 54, d f = 834, CFI = 93, NNFI = 93, and RMSEA = 07), this model's fit differed from the fit of the baseline measurement model (χ^2_{diff} = 184 90, d f $_{diff}$ = 96, $p <$ 01) Still, the invariance of the factor loadings, factor variances, and covariances suggests that comparing model paths across samples is appropriate

Analyses and Results

Structural Model Procedures and Results

To test the structural models, we used a multiple-group approach akin to the method that Singh (2000) uses With this approach, we estimated two multigroup models The first model freely estimates all paths across samples (i e , the baseline structural model) The model is then compared with a model in which all paths are constrained to be equal across samples (i e , a full structural invariance model) If the difference in fit between the two models is not significant, there is evidence that all structural paths are invariant across samples If structural invariance exists, hypothesized paths can be tested with the multigroup approach

Mediated model We first used this approach for the mediated model that appears in Figure 1 As we previously noted, we measured three control variables service employee job satisfaction, OC, and customer satisfaction As is the recent trend in structural equation models to control for variables that are not central to study hypotheses (Baltes and Heydens-Gahir 2003, Rothbard and Edwards 2003), we also estimated paths among the control variables and the focal constructs (prior research suggests 14 paths among the focal constructs and control variables, Podsakoff et al 2000, Oliver 1997) Thus, for all structural models that follow, the paths among the focal constructs ("Hypothesized Paths" in Table 3) reflect the effects of simultaneously estimating paths among the focal constructs and control variables ("Control Variable Paths" in Table 3)

The baseline structural model of freely estimated paths across samples demonstrated fit levels approaching adequacy (χ^2 = 2082 60, d f = 768, CFI = 89, NNFI = 88, and RMSEA = 08), as did the full structural invariance model (χ^2 = 2089 83, d f = 788, CFI = 89, NNFI = 88, and RMSEA = 08) Given that the difference in fit between the two models was not significant (χ^2_{diff} = 7 23, d f $_{diff}$ = 20, $p >$ 10), all paths are equal across groups, and we offer the results for the mediated model based on full structural invariance

We predicted that WFC and FWC would affect (produce) job stress (H_1) As we show in Table 3, the WFC → job stress path was significant and positive, in support of H_{1a} Although correlated with job stress (φ = 41 and 46 from Tables 1 and 2), the FWC → job stress path was not significant, likely because of the shared variance between WFC and FWC Still, the WFC and FWC paths explained 45% of the variance in job stress H_2 posits direct effects of job stress on IRP and CDERP As we show in Table 3, both hypotheses were supported, explaining large portions of the variance in IRP (R^2 = 64) and CDERP (R^2 = 57) Finally, H_3 of the mediated model predicts that both IRP and

TABLE 3
Multigroup Full Structural Invariance Model Results

	A. Model Fit					
	χ^2	d.f	$\chi^2_{diff}(3)$	CFI	NNFI	RMSEA
Mediated model	2089 83	788	—	89	88	08
Incremental effects model	1884 80	785	205 03	91	90	07

	B Path Estimates							
	Mediated Model				Incremental Effects Model			
Hypothesized Paths	Unstandardized	Standardized	t-Value	Supported	Unstandardized	Standardized	t-Value	Supported
H_{1a} WFC → job stress	51	62	10 44	Yes	55	62	10 45	Yes
H_{1b} FWC → job stress	05	04	79	No	02	02	33	No
H_{2a} Job stress → IRP	–1 15	– 80	19 30	Yes	–1 14	– 80	19 14	Yes
H_{2b} Job stress → CDERP	–1 10	– 87	15 38	Yes	– 72	– 56	9 19	Yes
H_{3a} IRP → CPI	32	42	7 85	Yes	– 05	– 06	92	No
H_{3b} CDERP → CPI	33	38	6 63	Yes	18	21	3 73	Yes
H_{4a} FWC → CDERP	—	—			– 18	– 14	2 94	Yes
H_{4b} WFC → CDERP	—	—			– 34	– 32	5 73	Yes
H_5 Job stress → CPI	—	—			– 82	– 74	9 02	Yes
R^2 Job stress	45				44			
R^2 IRP	64				65			
R^2 CDERP	57				69			
R^2 CPI	53				69			
Control Variable Paths								
WFC → job satisfaction	05	05	61		08	08	1 12	
WFC → OC	09	33	2 48		08	21	2 32	
FWC → job satisfaction	08	07	1 08		05	04	60	
FWC → OC	– 09	– 18	2 36		– 10	– 20	2 61	
IRP → job satisfaction	– 06	– 07	79		– 13	– 16	1 90	
Job satisfaction → OC	13	32	4 09		12	30	3 85	
Job satisfaction → CDERP	– 16	– 15	3 13		– 15	– 14	3 14	
OC → CDERP	– 27	– 10	1 68		– 25	– 09	1 60	
Job stress → job satisfaction	– 78	– 64	6 40		– 90	– 74	7 57	
Job stress → OC	– 21	– 44	4 35		– 22	– 45	4 40	
IRP → customer satisfaction	11	16	1 99		11	16	2 06	
CDERP → customer satisfaction	32	42	6 08		33	43	6 53	
Job stress → customer satisfaction	– 10	– 11	1 09		– 09	– 10	1 02	
Customer satisfaction → CPI	– 06	– 05	98		– 10	– 09	1 89	

CDERP positively affect CPI Both paths were supported, explaining 53% of the variance in CPI

Incremental effects model H_4 posits that both FWC and WFC incrementally affect CDERP (i e , job stress does not fully mediate the WFC/FWC effects on CDERP) H_5 posits a direct effect of job stress on CPI—that is, job stress explains incremental variance in CPI beyond that which IRP and CDERP explain To test the hypotheses, we added paths from FWC and WFC to CDERP and a path from job stress, to CPI, to the mediated model to create the incremental effects model Again, we used a multigroup model approach in which the baseline structural model of freely estimated paths across samples showed adequate fit (χ^2 = 1875 85, d f = 762, CFI = 90, NNFI = 89, and RMSEA = 07) The full structural invariance model also fit well (χ^2 = 1884 80, d f = 785, CFI = 91, NNFI = 90, and RMSEA = 07), and its difference in fit from the baseline structural model was not significant (χ^2_{diff} = 8 95, d f$_{diff}$ = 23, $p >$ 10), again suggesting that all paths are equal across groups Thus, in Table 3, we offer the results for the incremental effects model based on full structural invariance

Consistent with the writings on mediation (Iacobucci and Duhachek 2003), we first compared the incremental effects model to the mediated model The difference in fit between the two models was significant (χ^2_{diff} = 205 03, d f$_{diff}$ = 3, $p <$ 01), suggesting that job stress does not totally mediate the effects of FWC and WFC on CDERP and that IRP and CDERP do not totally mediate the effect of job stress on CPI The path estimates in Table 3 reinforce this conclusion The FWC → CDERP and WFC → CDERP paths were significant, and they explained an additional 12% of the variance in CDERP beyond that explained by job stress in the mediated model The job stress → CPI path was also strong, and it explained an additional 16% of the variance in CPI beyond that explained by IRP and CDERP in the mediated model

Relative Effects of WFC, FWC, Job Stress, and Performance

By employing multigroup analyses with the full structural invariance incremental effects model, we tested our relative effects hypotheses We tested each hypothesis with a chi-square difference test at 1 d f in which the two paths are constrained to be equal in one model but are freely estimated in another We show the results in Table 4 Although H_6 posits that the direct effect of FWC on CDERP is stronger than the direct effect of WFC, the hypothesis was not supported Both FWC and WFC equally affected CDERP We tested H_7 by comparing the job stress → IRP path to the job stress → CDERP path, and we found that job stress had a greater effect on IRP than on CDERP Finally, H_8 was supported because CDERP had a stronger direct effect on CPI than did IRP

Indirect and Total Effects of WFC and FWC

As we noted previously, WFC had strong direct effects on job stress and CDERP, and FWC had a direct effect on CDERP Although not hypothesized, WFC and FWC showed a series of important indirect and total effects as well Indirect effects are those that are mediated by at least one other variable, and total effects are the sum of the direct (e g , WFC → CDERP) and indirect (e g , WFC → job stress → CDERP) effects (Bollen 1989) The indirect effect of WFC on CDERP through job stress was significant (unstandardized indirect path = – 31, standardized indirect path = – 29, t = 6 97, $p <$ 01), as was the total effect of WFC on CDERP (unstandardized total effect = – 65, standardized total effect = – 69, t = 11 41, $p <$ 01) The indirect effects of WFC on IRP (unstandardized indirect path = – 59, standardized indirect path = – 49, t = 9 67, $p <$ 01) and CPI (unstandardized indirect path = – 48, standardized indirect path = – 51, t = 10 18, $p <$ 01) were also significant Although FWC did not show a direct effect on job stress, it showed a direct effect on CDERP and had one total effect The FWC total effect on CDERP was significant (unstandardized total effect = – 18, standardized total effect = – 13, t = 2 62, $p <$ 01)

Discussion

Summary of Key Findings

Effects of WFC and FWC Both FWC and WFC had negative incremental effects on CDERP Thus, their effects on CDERP were not totally mediated by job stress Furthermore, WFC showed strong indirect effects on IRP, CDERP, and CPI

Effects of job stress and performance Job stress affected both aspects of performance, and job stress was more strongly related to IRP than to CDERP Both IRP and CDERP affected CPI in the mediated model However, job stress had a strong negative incremental effect on CPI that was not totally mediated by the positive effects of performance Finally, CDERP had a stronger effect on CPI than did IRP

Managerial Implications

Our results have important managerial implications However, to be beneficial, all the initiatives and programs that we subsequently discuss require a real cultural shift in the way an organization views its employees First, managers should be trained to regard their employees as family members, with all the issues and responsibilities that go with it, and they must understand that service employees do not leave family problems at the workplace doorstep (Rifkin 1996) Thus, just as service employees are asked to "take ownership" of customer problems, supervisors and managers may need to take at least some ownership of employee problems that stem from the work–family interface Managers who take the attitude that "it's not my problem" may effectively be hurting the organizational goal of customer retention Although training programs to teach managers these skills may seem like an obvious solution, many firms do not implement them because of the costs involved One study reports that fewer than half (43%) of firms currently train managers to respond to the work–family needs of employees (Galinsky and Bond 1998) Our results provide some evidence that not training managers to deal with service employee job stress and its WFC and FWC antecedents may also carry a high cost

Second, managers can structure the workplace so that employees are encouraged to balance work and family Managers can implement family-friendly programs that send signals that management supports family roles Some popular programs that members of *Fortune*'s "100 Best

TABLE 4
Relative Effects of WFC, FWC, Job Stress, and Performance

Path Comparison Hypotheses	χ^2_{diff}	Supported
H_6 FWC → CDERP > WFC → CDERP	2 15 (n s)	No
H_7 Job stress → IRP > job stress → CDERP	18 28	Yes
H_8 CDERP → CPI > IRP → CPI	8 46	Yes

Notes We conducted all χ^2_{diff} tests at a difference of 1 d f by comparing the model that constrained the paths of interest to be equal to the model in which the paths were freely estimated—that is, the incremental effects model with a χ^2 of 1884 80 and d f of 785 Except where noted as "n s " (not significant), all χ^2 differences were significant at the 05 level or better

Companies to Work For" have implemented include mentoring, child care, family leave, flextime, maternity/paternity leave, telecommuting, and on-site job counseling for work–family matters (Tkaczyk et al 2003) Research shows that such programs can reduce work and family conflicts (Lobel 1999), enhance employee performance (Konrad and Mangel 2000), and positively correlate with a firm's share price (Arthur 2003) However, such programs are not a panacea in addressing WFC, FWC, and job stress effects Management must be careful to design work–life initiatives with the specific needs of employees in mind For example, work–life initiatives have been shown to be more effective for companies with an educated and professional workforce (such as our samples) (Konrad and Mangel 2000) Therefore, we recommend that managers assess sources of WFC, FWC, and job stress and design programs that include the most appropriate elements for their workforce Not to consider each workforce individually may result in such policies being ineffective (Rau and Hyland 2002)

Third, managers can offer stress management workshops that, instead of offering employees advice on how to live life, ask for help in understanding how family roles affect work and what management can do about it (Osland, Kolb, and Rubin 2001) Workshops can create a welcoming forum in which employees freely provide suggestions for the better support of family roles There is some evidence that workshops can reduce stress Kossek, Colquitt, and Noe (2001) show that employee anxiety, irritability, and depression are reduced when managers encourage employees to openly discuss family concerns with supervisors and peers Thus, even the simple notion of seeking employee feedback can help employees feel more valued and less stressed

Fourth, properly trained managers can institute changes to the work itself For example, employee compensation packages could be restructured to reward customer satisfaction in addition to rewarding prescribed in-role outcomes (e g , call-time quotas) Indeed, some call centers have lowered expectations for the number of customer problems handled per shift and instead have empowered employees to take as long as is necessary to satisfy customer needs (Molpus 2003) Furthermore, managers could offer service employees a "voice" in determining aspects of their jobs For example, managers could restructure systems for scheduled employee breaks (in their busy complaint-handling days) that allow employees to participate in the decision as to when the breaks are needed Thus, managers and supervisors can create a culture that empowers employees, which may have the effect of helping employees balance the work–family interface and make the work itself less stressful

Fifth, firms may benefit from bolstering the mental health benefits for employees who cope with stress and conflict that stem from the work–family interface An initiative that seems particularly relevant is to assist employees in role and boundary management Qualified mental health professionals can help employees manage personal relationships both at work and at home There is evidence that the relationship between stressor and stress is largely the outcome of a person believing that he or she is unable to cope adequately with an identified threat (i e , dissatisfied family or superiors) (Lazarus and Folkman 1984) Thus, firms should consider assisting employees in developing relationship skills to successfully juggle competing roles

Theoretical Implications, Further Research, and Limitations

Incremental effects of WFC, FWC, and job stress Traditional models view the effects of WFC and FWC (job stressors) on performance as likely being mediated by job stress and the effects of job stress on customer outcomes as likely being mediated by performance However, our results suggest that this is not the case In the high-stress customer service job, outside-role conflicts can directly affect performance, and within-domain stress can directly affect customer outcomes Thus, future models may want to consider the context of the job when specifying relationships among WFC, FWC, job stress, performance, and customer outcomes When conflicts in the work–family interface and job stress are high, these constructs may directly affect important behavioral outcomes for employees and customers

Relative effects of WFC, FWC, and job stress Both theory and intuition suggest that FWC has a stronger effect on CDERP than does WFC However, the overall pattern of results suggests that this is not the case Our results show a direct "spillover effect" of WFC that affects CDERP Moreover, our results show that indirect and total effects of WFC on CDERP and CPI are stronger than are the indirect and total effects of FWC on CDERP and CPI We offer two speculative explanations as to why we obtained such results

First, perhaps employees are cognizant of the potential for FWC to affect their job performance, and thus they engage in processes or behaviors that partially compensate for the effect However, the opposite may not be true Employees may not be aware of the potential for WFC to affect job performance, and thus they may not engage in cognitive processes or behaviors that could reduce the effect Second, it has recently been demonstrated that FWC is likely to have a strong effect on work performance when the pressure to participate in the family domain (pressure from the family) is strong and the pressure to participate in the work domain (pressure from the firm or supervisors) is concurrently weak (Greenhaus and Powell 2003) However, in customer service settings, the opposite may be more likely Given the importance of employee performances in affecting customer evaluations, the pressure to participate in the work role could be stronger than the pressure to participate in the family role, resulting in a weaker FWC → CDERP path Further studies could examine why the WFC → job performance spillover effect is so strong What are other potential reasons for it? Is it as likely in less stressful marketing jobs?

With respect to the relative effects of job stress, we found that it affected IRP more than it did CDERP In stressful customer service job situations, when employees believe that they are unable to perform all roles, they may perceive doing extra things that help affect customer evaluations as more salient to their job-role identity Further studies might consider investigating different dimensions of performance and the relative effects of job stress on each dimension

Limitations and further research Our results are tempered with certain limitations First, given that we collected WFC, FWC, and job stress measures cross-sectionally, establishing a temporal ordering among these constructs is not possible Although our posited flow of WFC and FWC as correlated constructs that affect job stress is consistent with most research, other specifications are tenable (Williams and Alliger 1994) Although we estimated such alternative models and found a pattern of results similar to that which we report in Table 3, further studies that use experiments may better detect the causality among WFC, FWC, and job stress For example, Greenhaus and Powell (2003) manipulated family- and work-role pressures to determine their effects on the decision to participate in a work activity versus a family activity Such experiments may be useful to better show the causal flow among WFC, FWC, and job stress

Second, we did not collect two critical measures of role salience (1) the importance of the family role versus the job role for employees and (2) the importance of CDERP versus IRP Such measures could have helped solidify the findings and bolster the use of identity theory as a basis for some of the hypotheses Third, the WFC measure was more strongly related to job stress than was the FWC measure Although this finding is consistent with the theoretical rationale for the WFC and FWC relationships with job stress, wording of the WFC items may suggest more of a content similarity to job stress than does the wording of the FWC items Further studies might elect to use a job stress measure that assesses symptomatic health aspects related to work (e g , high blood pressure, loss of appetite) Fourth, we examined only one customer per service employee, and we related customer-specific purchase intent to employee performance measures, encompassing a six-month period Although extensive procedures suggest that our customer samples were not biased and the literature suggests that employee performance is relatively stable over time, further studies that examine multiple customers per employee are warranted

Appendix
Focal Construct Measures

WFC

1 Due to work-related duties, I have to make changes to my plans for family activities
2 The amount of time my job takes up makes it difficult to fulfill family responsibilities
3 The demands of my work interfere with my home and family life

FWC

1 The demands of my family or spouse/partner interfere with work-related activities
2 Things I want to do at work do not get done because of the demands of my family or spouse/partner
3 My home life interferes with my responsibilities at work, such as getting to work on time, accomplishing daily tasks, and working overtime

Job Stress

1 My job tends to directly affect my health
2 At the end of the day, my job leaves me "stressed-out"
3 Problems associated with work have kept me awake at night
4 I feel fidgety or nervous because of my job

IRP

1 How do you rate this employee in terms of quality of performance in regard to knowledge of your products, company, competitor products, and customer needs?
2 How do you rate this employee in terms of quality of performance in regard to management of time, planning, and expenses?
3 How do you rate this employee in terms of quantity of work achieved?

CDERP

1 How often did this employee go above and beyond the "call of duty" when serving customers?
2 How often did this employee willingly go out of his or her way to make a customer satisfied?
3 How often did this employee voluntarily assist customers even if it meant going beyond job requirements?
4 How often did this employee help customers with problems beyond what was expected or required?

CPI

1 If you (YOUR FIRM) were in the market for (products), how likely would you be to buy from (FIRM)?
2 In the future, I (MY FIRM) will use (FIRM) as a provider
3 In the future, I (MY FIRM) intend(s) to use (products) from (FIRM)

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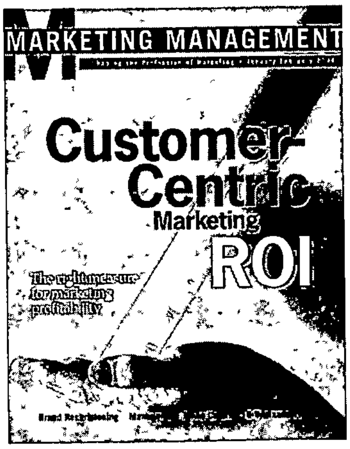

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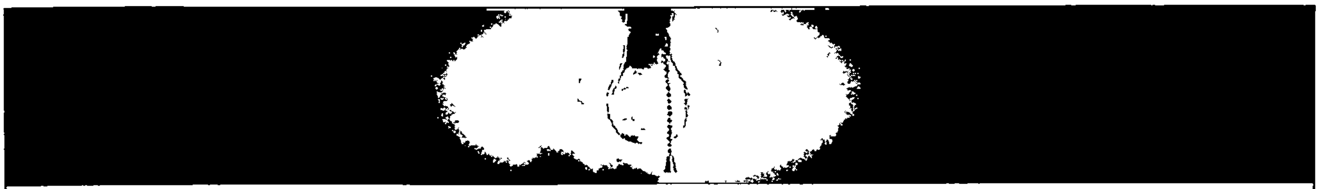

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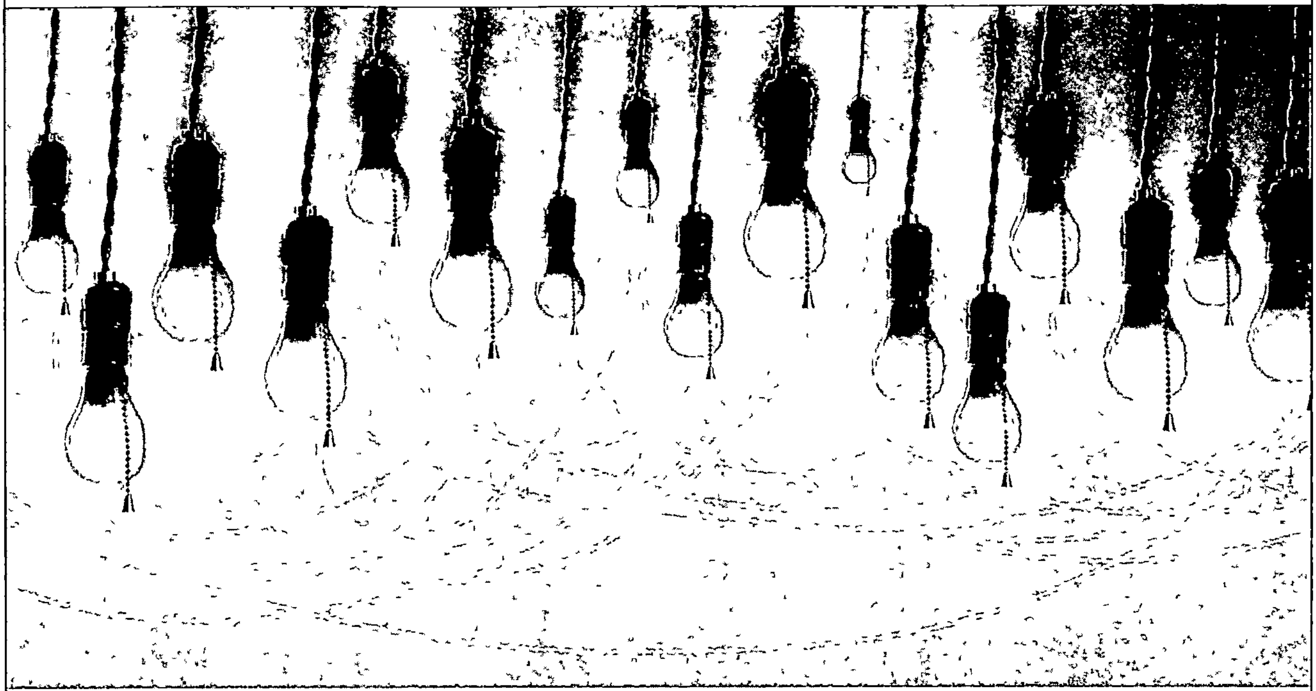

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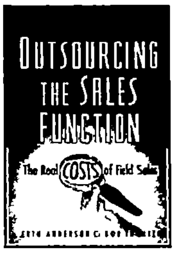

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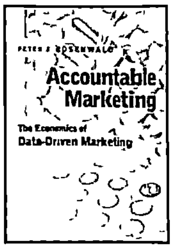

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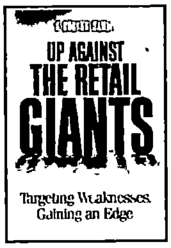
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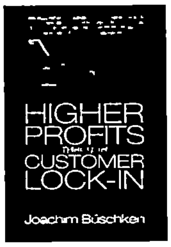

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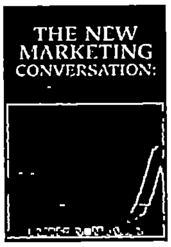

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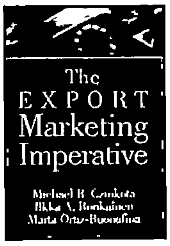

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